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The AUTOMOBILE

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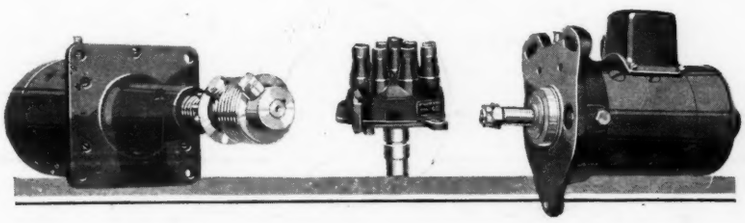

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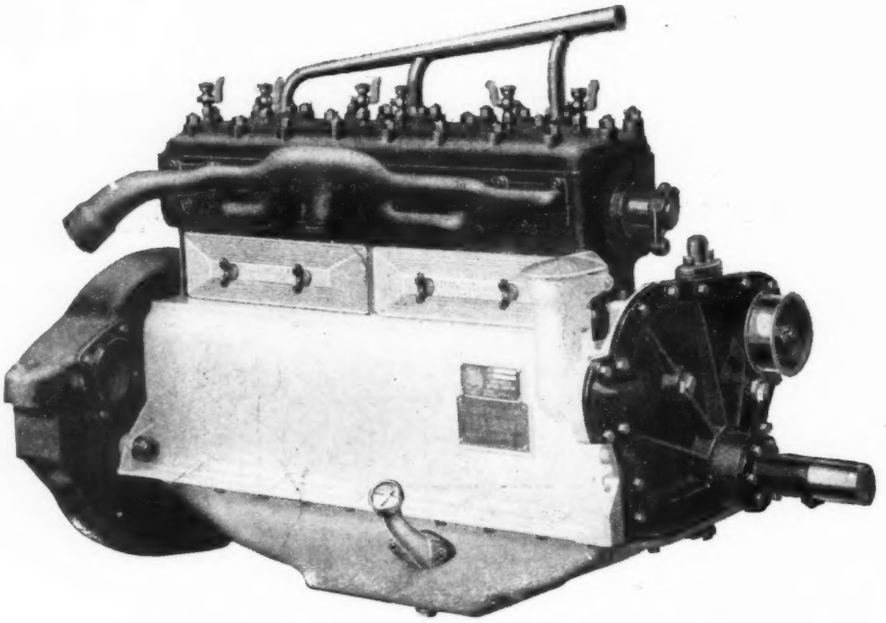


The First Exhibit of the New Red Seal Motors

The Continental Motors Corporation announces the first exhibit of the new Red Seal Motors at the New York and Chicago Shows.

These motors represent the judgment accumulated through seventeen years of the experience of the world's largest exclusive motor manufacturers.

Visitors at the shows are invited to inspect the exhibits which will be found at:

PASSENGER CAR SHOWS

New York: Grand Central Palace, Booth C-47
Chicago: Coliseum, Booth 50-51

TRUCK SHOWS

New York: 8th Coast Artillery Armory
Main floor Space 14-15-16
Chicago: International Amphitheatre,
Gallery Space 16-17

CONTINENTAL MOTORS CORPORATION

Offices: Detroit, Michigan
Factories: Muskegon—Detroit

Largest Exclusive Motor Manufacturers in the World

CONTINENTAL MOTORS — Powerful as the Nation — AMERICA'S STANDARD

Continental Motors

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLII NEW YORK—THURSDAY, JANUARY 8, 1920—CHICAGO No. 2

Engineering and Merchandising in 1920 Show

While viewing the newest efforts of the designers, manufacturers carry forward their plans to reconstruct the sales forces disrupted by war conditions. The show is notable more for the greater display of quality work than for surprises. An export office is provided. Refinements of assembled cars are a feature.

By J. Edward Schipper

New York, Jan. 3.

THE Renaissance of the automobile industry is born today with the opening of the New York Show. Of unusual interest is this show, because this and the Western exhibitions are to be the occasions for real reconstructive steps in repairing the war-torn merchandising fabric necessary to take care of the coming year's production plans. It is a show of engineering interest, because of the new, real post-war cars shown in the Grand Ceneral Palace and elsewhere, but far more than that it is a show of tremendous merchandising interest, where new sales plans are being unfolded and the machinery necessary for the marketing of the 1920 and future production, oiled and put in order.

Dealers and prospective dealers from all sections of the country are coming in greater numbers than for years past to contract and arrange for quotas. It is only now that the organization shattered by the big reduction in production plans for 1918 are being reestablished. It is only now that the factories are prepared to enter into the production necessary to supply the intense demand which has accumulated all over the country.

For the past few weeks there has been some discussion as to the possible tightening of the car market and the increase in sales resistance. This talk has subsided with the realization of the demand which will be created by the return to intensified selling. It is only natural that selling has been localized to a certain extent during the past months. When the factories ceased to be able to supply cars, dealers who had more retail orders than they could take care of, began to pare off subdealers. Territorial distributors in turn began to pare off the dealers and finally factories were compelled to reduce their representation. The result is that hundreds of the smaller, and a great many of the larger, dealers

History of the New York Shows in Figures

	Garden and Palace 1913	Palace 1914	Palace 1915	Palace 1916	Palace 1917	Palace 1918	Garden and Palace 1919	Palace 1920
Total exhibitors	424	349	317	391	323	331	198	307
Car exhibitors	89	78	80	81	95	79	56	81
Accessory exhibitors	320	259	223	306	227	252	141	225
Motorcycle exhibitors	15	12	14	1	1	0	1	1
Two-cylinder engines	0	2	0	0	0	0	0	0
Four-cylinder engines	202	162	126	116	120	82	40	65
Six-cylinder engines	112	116	134	135	143	155	141	223
Eight-cylinder engines	0	0	8	41	47	36	34	29
Twelve-cylinder engines	0	0	0	13	15	9	8	7
Steam	0	0	0	0	2	4	0	2
Electric	10	17	15	17	13	11	2	8
Total cars and chassis shown	324	297	283	322	340	297	225	334
Open Cars	213	195	175	194	195	175	127	176
Closed Cars:								
Owner Driven	21	19	10	8	6	56	58	103
Chauffeur Driven	32	24	26	20	31	21	21	16

were left without merchandise, temporarily. These and others are returning, and if the opening days of the show are any criterion, the New York Show of 1920 will be the greatest merchandising success in its history, and it is expected that Chicago will be even more notable in this regard.

There is a ready market for 2,000,000 cars in this country, according to estimates of manufacturers. Even if the production for 1920 reaches the total computed from present manufacturing schedules, it will not be possible to supply the enforced demand, as it is believed that spring will increase the figures. The spring of 1920, according to present indications will witness the heaviest sale in the history of the industry, and manufacturers are not promising immediate deliveries. In other words, the shortage of cars and the existence of long time deliveries are expected to be almost as acute in 1920 as it was in 1919, in spite of the greatly augmented production.

A novelty at the Show was the office space and equipment set aside as an "Export Department." Here are desks and other conveniences for the export manager, which is a recognition on the part of the show planners of the increased interest the American manufacturer is showing in the overseas trade and also a recognition of the merchandising interest of the show. It is the first recognition of this in the National Shows.

HIGHER PRICED CARS

One of the greatest indications of the tremendous purchasing wealth of the country, is in the increased production of the higher priced cars. Looking about the show, one is fairly amazed at the manner in which the $3,000 car of 1920 has taken the place of the $1,800 car of 1915. The tremendous wealth of the country, the decreased value of the dollar, the increased real value of the car, with its better design, better workmanship and better materials all hold even the most experienced show visitor spellbound. Here, arrayed to their best advantage, are the cars that those of us who are continually about the factories do not appreciate as the buyer does, until we start out to buy one for ourselves. But seen here, together, the big stride the industry has made during the year becomes apparent.

We are on a higher plane. The cars are better. There is not a manufacturer who has not improved quality during the year, and when the purchaser asks where the increased price is justified, he is met with answers which include more than the cost of labor and materials. One of the most gratifying points to be noted in the shows is the improvement in quality in the smaller cars. The idea that the small car must be "cheap" with all that the word implies is passing. In its place we are supplied with cars that may not be as long in wheelbase, but which are just as well equipped and are just as good engineering jobs as the larger products.

QUALITY PARTS

Practically all of the new products, whether the cars are large or small, are in the higher-priced field. This is to be expected under present conditions. The amount of money required to enter on a manufacturing program large enough to produce a car on a small margin of profit, is tremendous. The day is past when a concern with a few hundred thousand dollars can undertake the manufacture of a $1,500 car. The assembled car cannot sell for much under $2,000 because of the price of the component parts, and since all but the exceptional companies must buy a majority of the parts ready made, it precludes the possibilities of the lower-priced assembled products of 4 and 5 years ago.

The assembled cars at the show are a revelation as to quality. The refinement in the products of the parts makers is one of the most noticeable points at the show. Engines of higher efficiency, lighter weight and increased torque in the lower speed ranges are universal. The general engineering trends in the detail design of these products have been delineated elsewhere in this issue, but the general idea which prevails is that there is noticeable improvement in the manifolding to permit of better operation in cold weather with the low grades of fuel.

Perhaps it is the manufacturing possibilities that the most imortant improvements have been made. Practically without exception parts have been designed in such a way that it is not only possible to economize in manufacturing costs, but also to get a better product. For instance, the use of the detachable head has permitted of machined combustion chambers with very simple machine operations. The simpler castings resulting from this method of manufacture has cut the casting loss. The open top has made accurate cylinder manufacture not only more easy, but really possible. It is certain that the machined combustion chambers with their equalized volumes have resulted in more evenly performing engines.

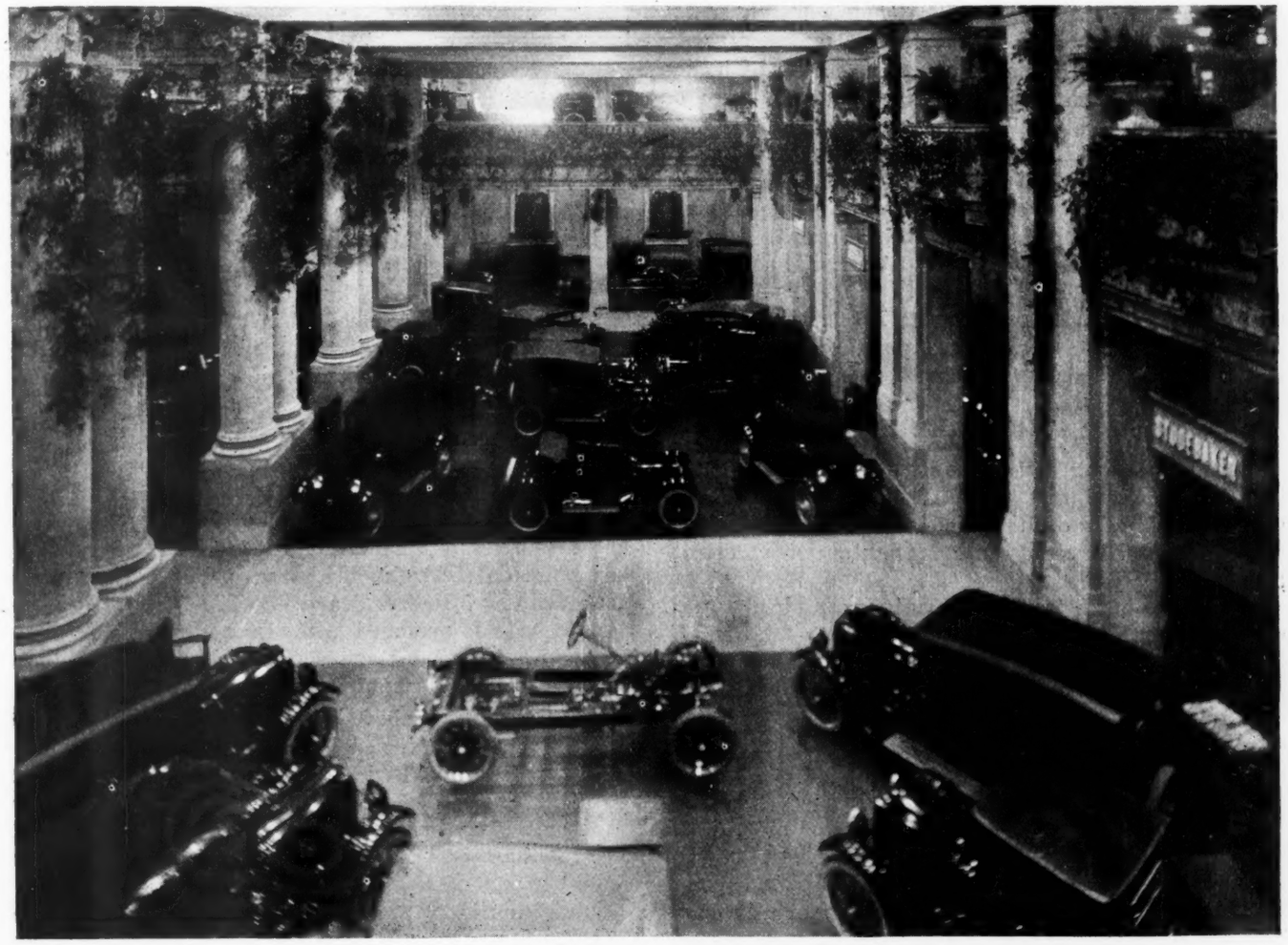
It is not purposed here to go into detail on engineering trends or refinements but merely to sketch a few of the high lights which impress themselves on a visitor to the show. With a mental picture of what has occurred in the industry during the past two years the exhibition at the Palace represents the real beginning of a new period in the industry. We are now practically through with most of the disturbances caused by the war and this show offers us an opportunity to take stock of ourselves and see where we stand. We see the industry more segregated into classes than ever before.

The low priced cars are practically all in the hands of a few big manufacturers. The medium priced cars from $1,500 to $3,000 are in the hands of those who largely buy their products from the parts maker. The high priced cars of $3,000 and beyond, are in the hands of those who have set out to produce in their own plants a product of superior materials and workmanship.

In all three of these classes the object of providing the most efficient vehicle for transportation has played a part. In the high priced cars, this part is more or less subdued and the elements of comfort and life stand out in the selection of the finest materials with the most careful workmanship to extremely close manufacturing limits. In the low priced cars, the question of performance has in no instance been neglected. Torque-weight ratios, or in other words, acceleration and hill-climbing ability at ordinary running speeds, are as good as in the high priced cars.

From an exhibition standpoint the show of 1920 will probably rank as the best display to date. This is the twentieth national automobile show, the first being held

The 1920 Show at the Palace



The Palace was dressed in winter "toggery," southern vines with red berries relieving the whiteness of the pillared interior

in 1900 at Madison Square Garden, at which there were 31 exhibitors of complete motors cars. At the present show there are 87 passenger cars, 75 trucks and 284 accessories. There are 295 complete cars on the floor of the Palace and 39 chassis. Of the cars shown 65 are fours, 223 are sixes, 29 are eights, and seven are twelves. Year by year the number of closed bodies gains on the open. This year there are a total of 119 closed to 176 open. Seventy-five of the open bodies are five-passenger, and 35 are seven-passengers. There are 41 four-passenger types showing the popularity of the sport or speedster designs.

There are not many surprises at the show, but on the other hand there are a few cars which have not been exhibited elsewhere. These include the Saxon, the new Paige 6-42, the Marmon, the Light six Maibohm, a refined Liberty, a new Studebaker, Scripps-Booth, Briscoe, Roamer, and Jackson. Some of these cars, such as Marmon, Studebaker, Briscoe, and Paige have been or will be described in AUTOMOTIVE INDUSTRIES in detail in recent or early issues.

THE TRUCK SHOW

Seventy makes of trucks comprising 288 vehicles were on exhibition at the opening of the New York Motor Truck Show on January 3, at the Eighth Coast Artillery Regiment Armory in the Bronx. Unlike previous shows, the majority of the vehicles were equipped with bodies. In addition to the complete truck exhibit there were shown three makes of trailers, and two makes of bodies. Truck parts including engines, axles, wheels, were on view in booths located along the walls of the armory.

Among those listed as new models were the four-cylindered Autocar, the Graham 1½-tonner, the Sterling 5-tonner with its six speed transmission, 3-ton pnuematic tired Packard and the 5-ton Ward LaFrance. Like the previous model the new 3½-ton Autocar's powerplant is located under the driver's seat. A complete description of this new model will appear in an early issue.

A feature of the truck show, was a series of service and sales development programs each afternoon and evening.

THE SAXON

Considerable interest attaches itself to the Saxon which is shown for the first time. Appearing on a 112-in. wheelbase chassis of the well-known Brush type, it represents an interesting type of light-weight construction.

The engine incorporates the Brush overhead valve gear, which has the feature of being adjustable while the engine is running. It is a six-cylinder, block-cast unit powerplant design, suspended in the frame at three points, with a trunion in front and rigid rear support bolted to a subframe through a solid oak block. The cylinder dimensions are 3⅛ by 5 in.

The crankshaft is supported on two main bearings, the front being ¾ in. diameter by 2⅝ in. length and the rear 2⅜ in. diameter by 3½ in. length. The crank pin or lower connecting rod bearings are 2¼ in. diameter by 1½ in. length. A feature is the use of tubular members for inclosing the valve stems and for oil passage from the crankcase for lubricating the overhead valve mechanism.

A hot-spot is incorporated in the intake manifold, being so designed that the heavier fuel products are thrown into the heated recess by their own inertia, and the parts of the fuel which have already been vaporized pass through the manifold without entering the heated recess, thus eliminating the excess heat which would tend to cut down the volumetic efficiency through expansion. The carbureter is a Stromberg, fed by vaccum feed from a gasoline tank on the rear.

The drive is through a Detlaff clutch, to a floating type of rear axle, of which the make for production cars has not as yet been settled. The drive and torque are taken through radius rods and a torque member. The rear spring is the cross cantilever type familiar to Brush designs. The gearset is a Covert. The car is equipped with Wagner starting, lighting and ignition.

Touring and sedan bodies are shown. The car has a distinguishing line which runs from near the edge of the radiator to the rear end of the body. It is equipped with exterior and interior door handles, incorporating a patent anti-rattling feature. In the tonneau there is combined tonneau and trouble lamp with an extension cord. The touring car sells for $1,785 f. o. b., Detroit. The price of the Sedan will be announced later.

THE PAIGE

Incorporated in a new model, known as the 6-42, Paige is exhibiting a new engine designed and developed in its own factory. It is mounted on a 119 in. wheelbase chassis which with the 6-55 of 1919 on the 127 in. chassis will make up the line for 1920.

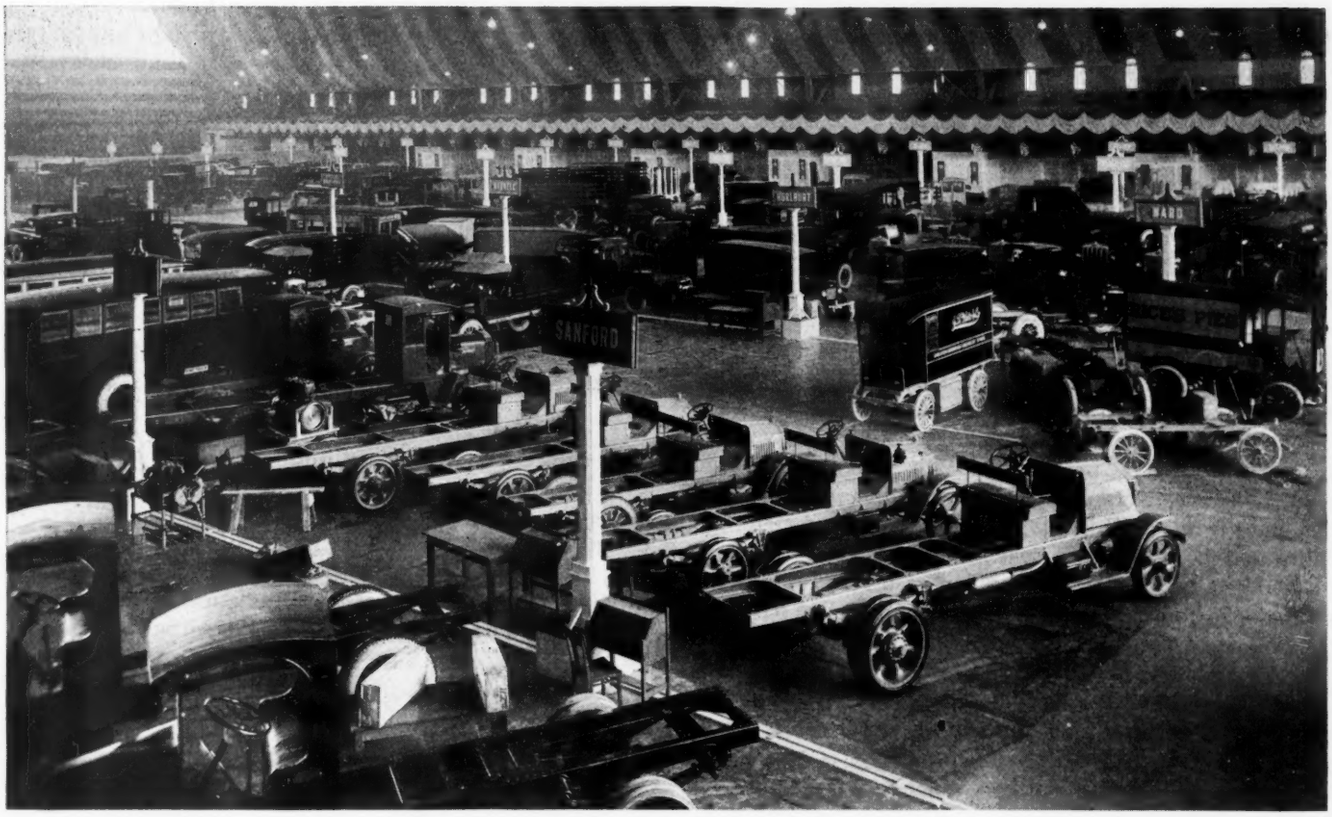
The new car is different throughout from the older model, being a smaller six and besides incorporating the new powerplant, it has a single straight line propeller shaft instead of the two-piece unit with the universal joint in the larger model. The engine and gearset are made in the Paige factory and the majority of other parts obtained from well-known parts makers, including the Borg and Beck clutch, Detroit universals and propeller shaft, Salisbury axles, Kelsey wheels, Jacox steering, National Can, radiator, Gray and Davis lighting and starting and Atwater Kent ignition.

L-head construction is used in the 3⅛ by 5 in. powerplant. The cast iron cylinder block is in a unit with the upper half of the crankcase. The head is separate and is another iron casting. The bottom pan is a stamping. The carbureter is on the left side of the block and the valves are on the right, the gasses being led across the block between cylinders 3 and 4. The fore and aft intake passage is arranged with the bottom half in contact with the exhaust passage, giving a modified hot-spot construction, helping vaporization.

Three rings, two above and one below the piston pin are used on the crowned grey iron pistons. The connecting rods are 10½ in. long, bushed with bronze at the upper end and lined with babbitt at the lower. The crankshaft is a three-bearing type of 2⅛ in. diameter. The camshaft is 1-in. in diameter and is driven by a Fabroil gear.

Lubrication is by combined force feed and splash, the oil being forced to each main bearing by a plunger pump driven from an eccentric on the camshaft. The pump is bolted to the bottom face of the cylinder by three screws

Showing the 1920 Trucks



The year's truck show was held at the Eighth Coast Artillery Armory. These general views convey an idea of the immense size of the exhibition hall

which are readily accessible for removal. The pump plunger is of steel tubing.

The gearset is bolted directly to the flywheel housing forming a unit powerplant. The shafts are carried on Hyatt roller and annular ball bearings. A Yale lock is fitted to gearset for holding the gears in neutral. Final drive is by the Hotchkiss method to a floating axle. The bodies are straight-line moulded types.

THE MAIBOHM

A new Maibohm is a six-cylinder assembled product, incorporating the Falls engine fitted with Stromberg carbureter, Stewart vacuum gasoline feed, Atwater-Kent ignition, and Wagner starting and lighting with a Willard 6-volt, 94-amp. hr. battery. The clutch is a Borg & Beck 10 in. and the gearset a Mechanics selective providing three speeds and reverse. Final drive is by the Hotchkiss system, through two flexible disk universals to a floating Brown-Lipe-Chapin axle.

The Falls power plant is the six-cylinder, valve-in-the head 3⅛ by 4¼ in. design with a Wyman-Gordon counter-balanced crankshaft. The engine peaks at 3,990 r. p. m. It is cooled by a thermo-syphon system, and lubricated by a pressure system.

Two types of body are provided at present, a five passenger phaeton selling for $1,395, and a five-passenger sedan for $2,100 f. o. b., Sandusky. A set of five Houk wire wheels with a carrier can be secured as extra for $90. Bosch magneto is provided for $50 extra, and right drive for $25. The finish on the phaeton is dark green, and on the sedan dark blue. The phaeton is upholstered in real leather, tan Spanish, with French pleats. The sedan is finished in French grey cloth. Both bodies are on the 116-in. wheelbase chassis, which has a road clearance of 10½ in. The tires on the phaeton are 32x3½ in. and on the sedan 32x4 in. The equipment is complete including a one-man Neverleak top, with nickel plated rear curtain lights and side curtains which open with the doors. A Stewart 75 mile speedometer is provided. On the sedan a tonneau heater and door keys are also among the standard equipment.

THE LIBERTY

Refinements in the Liberty chassis are disclosed in the new model. The car is two inches longer in wheelbase, but by a rearrangement of the engine mounting to meet the hood, it has been possible to add four inches to the body, 1½ in. being the increase in the front compartment and 2½ in. in the rear. The engine has been revised to some extent to give larger water jackets and an interesting change in the cylinder head provides the head casting in three in place of the single casting, which formerly covered the entire block.

The advantage of having these three cylinder heads interchangeable is that gaskets are saved because it is not necessary to destroy them in removing the head. Each of the small castings has an integral lip which can be utilized for tapping to loosen the head before it is removed. The smaller head is inherently more rigid so that there is less liklihood of distortion in tightening the studs. Also in manufacture the stresses are not as severe on the smaller casting.

Refinements in the oiling system eliminate the splash and make the system full pressure with the oil forced through the crankshaft and fed by spray from the lower rod bearings. The oil feed control is by a vacuum system which so controls the flow of lubricant that the greatest pressure is exerted when the engine is operating under the greatest load. This pressure system provides a greater flow of oil to the bearings and in proportionate quantities to the work done and has proven itself to be more economical.

The brakes are larger on this model than in the previous design, being 14 in. as compared with 12 in. A change in the electrical equipment incorporates the Wagner system for starting, lighting, and ignition. The car is furnished in five-passenger roadster, four-passenger, coupe, sedan, brougham and landaulet form, all of which are completely equipped. The five-passenger and two-passenger models sell for $1,695 and the four-passenger for $1,785. The sedan is $2,595. With five wire wheels $100 is added to the above prices.

THE ROAMER

A choice of either the Continental or Duesenberg engine is offered in the Roamer. These cars, made by the Barley Motor Car Co., are offered in either open or closed lines, a specialty having been made of the closed type of body. Four of the closed designs are Rubay products, these being the sedan, limousine, landaulet, and town car. The cabriolet, coupe, and surburban are built by the Barley company.

THE SCRIPPS-BOOTH

The series B Scripps-Booth models for 1920 are in four body types, consisting of a five-passenger touring, three-passenger roadster, five-passenger sedan, and four-passenger coupe. These are all mounted on the 150 in. wheelbase chassis which is fitted with the Northway six-cylinder engine. The engine has a Marvel carbureter, and is lubricated by pressure through a drilled crankshaft.

This car is scheduled for quantity manufacture in a new plant in Detroit. It is made up of units which are largely familiar to the trade, and the chassis has been fitted to use the new Alemite lubricating system with grease gun in place of the oil cups. With this exception the car remains practically the same as the 1919 product. The prices, however, have been revised and are now as follows: Five-passenger touring and the three-passenger roadster, $1,425; five-passenger sedan, $2,175; and four-passenger coupe, $2,095.

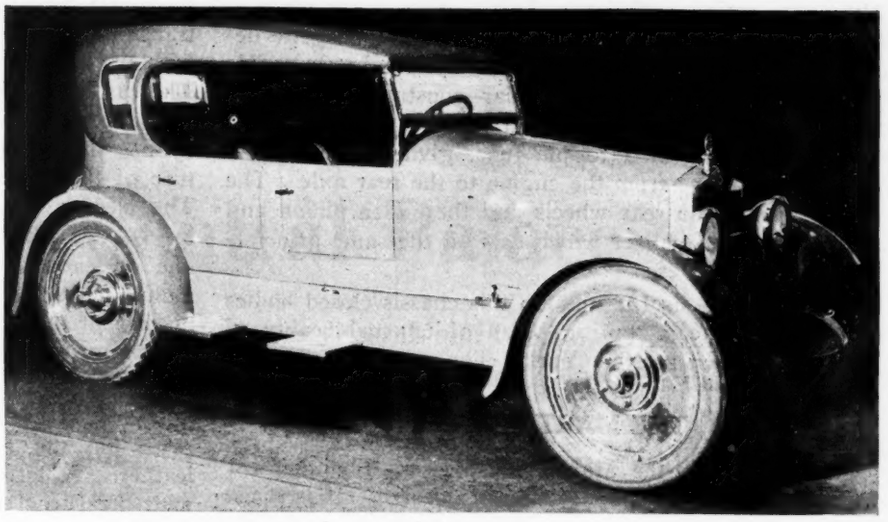
THE JACKSON

An entirely new Jackson makes its appearance. It is an assembled product, incorporating the Continental engine, Borg & Beck clutch, Covert gearset, Salisbury axles, Long radiator, and Hayes wheels with Goodyear tires.

The Continental engine is 3¼ by 4½ in. unit, with the carbureter bolted directly to the cylinder block. This is one of the newest of the L-head engines made by this concern for the trade and incorporates a hot-spot construction, and a very heavy crankshaft 2¼ in. in diameter. It is cooled by centrifugal circulating system and lubricated by combination pressure and splash. The carbureter is a Stromberg 1 in. side outlet type. Starting and lighting is provided by an electric Autolite system.

Hotchkiss drive with tubular propeller shaft and semi-

elliptic springs is utilized, the rear axle being a three-quarter floating, with a housing of reinforced pressed steel. The feature of the construction of this axle is that the driving gear and differential are mounted on a separate carrier which is bolted to the housing and removable without taking the axle from the car. The foot brakes are on the rear wheels, being mounted on a 12-in. drum with 2 in. face width. The hand brake is on the front universal joint at the rear of the gearset. The wheelbase is 121 in.



The New Jackson

Rather distinctive lines are incorporated in the body, the radiator being angular with the lower end narrower than the top. A straight line is carried from the front end of the radiator to the rear part of of the radiator to the rear part of the tonneau running along the profile edge with a bevel. The doors are 24 in. wide and the curtains open with the doors.

THE MILBURN

The Milburn has two new electric models, one a coupe seating four persons and the other a taxicab or chauffeur-driven town car which seats four passengers in the enclosed compartment. The coupe has a wheelbase of 105 in; the taxicab, 111 in. The taxicab has the general lines of a gasoline car, while the coupe has the appearance characteristic of the electric closed car.

Following are some of the more important features of the taxicab. This model is equipped with a 42 cell, 15 plate battery and can be operated at speeds ranging from 5 to 30 m. p. h. By the extensive use of high grade steel and of aluminum, the weight of this model has been kept down to 3,300 lbs., although the weight of the battery alone is 1,200 lbs. Mileages of from 60 to 90 are obtained from one charge of the battery, according to road conditions. The steering lock is such that it can be turned in a circle of small diameter. Access can be had to the battery for flushing by simply lifting the hood and the cover on the luggage carrier space at the left of the driver's seat.

The special feature is the interchangeable battery. The latter is mounted on a pressed steel carrier on rollers and can be removed from the vehicle and replaced by another battery in a few minutes time. It is rigidly held in place by means of clamps and when it is desired to interchange the battery, all that is necessary is to lift the cover, unscrew the clamping nuts a few turns, let down the clamping bars and pull the battery out. This interchangeable battery feature makes it possible to get daily mileages of from 140 to 220 out of the car.

The controller lever, located at the left of the driver, besides serving to operate the controller, also applies the service brake, the latter operation corresponding to the rearmost position of the lever. The emergency brake acts on the rear wheel drums and is operated by means of a pedal. When these brakes are applied, the power is automatically shut off from the motor.

The coupe has a battery equipment of 40 cells having 13 plates each. The maximum speed is 25 m. p. h. and the mileage obtainable from a single charge ranges between 75 and 90. This model complete weighs 2,900 lbs.

The prices are $2,485 for the coupe and $3,250 for the taxicab, both f. o. b. factory. Both models carry 33x4 in. cord tires.

There are three exhibits at the Hotel Commodore, the new LaFayette, Martin Wasp and the exhibtion of the Nordyke & Marmon Co., wherein is shown the manner of tearing down and re-assembling the Marmon 34 engine.

THE LAFAYETTE

The LaFayette, designed by D. McCall White, incorporates an eight-cylinder engine with many unique features. It is a V-shape 3¼ by 5¼, peaking at 4,000 r. p. m. and is distinguished by its lightness and simplicity. Throughout, the car is noteworthy for the extensive use of alloy steels and aluminum and it is replete with original and ingenious features. The engine is a single camshaft type with hollow camshaft and sixteen cams. The valve action is direct, the roller followers bearing directly on the cams. The valves are set at an angle of 9 deg. with the cylinders, producing an angle of 109 deg. in the valve alley. This gives unusual accessibility.

The crankshaft is the Liberty engine type, of 2¼ in. diameter, mounted on five main bearings. The shaft is hollow and is used for oil circulation, this being under pressure to all surfaces. In cooling there are some unusual features, notably the patented dual water pump which has neither gears or bushings. The air circulation is taken care of by thermostatically controlled vertical shutters on the radiator. The fan is a high speed type, driven by adjustable chains. The water pump feeds each block of cylinders independently from a common intake and the impeller is fastened to an extension of the crankshaft and driven from it. In fact the crankshaft is also the pumpshaft and no bearing is required.

The clutch is a multiple disk, dry-plate type with seventeen steel plates of which the driving plates are faced with asbestos. The gearset is three speed in an

aluminum casing with large shafts and a cover plate of easy accessibility. The rear axle is also a LaFayette design in which lightness is secured by the best possible materials and the use of tubular construction. There is an aluminum differential carrier. The tubular drive shaft is enclosed in a torque tube, giving practically a straight line drive from the engine to the rear axle. The brakes are on the rear wheels and there is a pinion and sector type of equalizer which acts on the same principle as a differential.

The wheelbase is 132 in. On this chassis closed bodies will predominate, a touring sedan of unusual beauty of line being shown at New York. The price has not been set.

THE MARTIN WASP.

A newcomer is the Martin Wasp, a four-cylinder car with a custom-built body of unusual design. It is made by the Martin Wasp Corp., Bennington, Vt., and uses a Wisconsin engine of 4¾ in. bore and 5½ in. stroke. It has a 132 in. wheelbase and carries 33 by 5 in. cord tires. Two extra tires and wheels are carried at the rear. There are four speeds forward, with direct drive on fourth speed. The universal joints are Spicer and the axles Timken. The body work is quite out of the ordinary, natural finished ash being used to a great extent in the interior. The upholstery is detachable and the seats are low. The tonneau has a slanting footboard similar to that in the driving compartment. Other features are a vertical, double pane windshield, top, four bow in natural finish of the Rickshaw type, lights in windshield, polished metal instrument board and an aluminum hood. The body is finished in satin black. The car will sell for $5,000.

THE H. C. S.

Two entirely new cars are in the lobby of the Hotel Astor, the H. C. S., designed by Harry C. Stutz and built by the H. C. S. Motor Car Co., and the Ferris, built by the Ohio Motor Vehicle Co. The H. C. S. has been designed to render quick service.

There are no grease cups and the starting motor, generator and ignition head are on the right side of the engine in the most accessible position. It is possible to dismantle any unit of the car, such as the rear axle, transmission, or remove the engine, steering gear, etc., without in any way disturbing the neighboring units. The car has a 120 in. wheelbase and is priced at $2,950. It has a Weidely four-cylinder engine of 3⅝ in. bore by 5½ in. stroke, with the valves in the head. A feature of the engine is the Lanchester vibration dampener. The electric system is three unit Delco. Tires are 32 by 4½ in. and two extra wheels and tires are carried, one on each side. No running boards are used, two aluminum steps taking their place. The radiator is nickel-plated and a short brace is placed back of it to the engine, instead of the usual long brace running from radiator to dash.

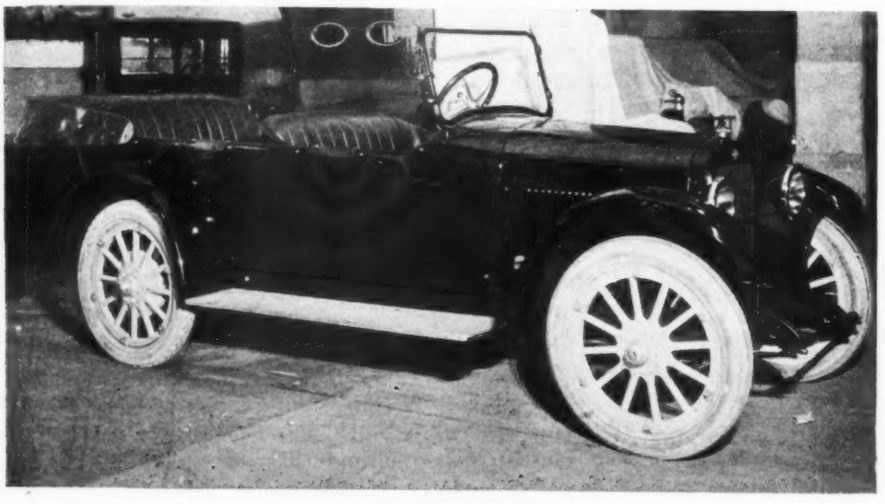
The seats are very low, the cushions being placed directly on the floor. Upholstery is in hand-embossed leather. A large gasoline tank is placed on the rear with pressure feed to the carbureter. Force-feed oiling is used and the valve mechanism is oiled by direct pressure through a separate line. Refinements on the car include a spotlight bracket integral with the windshield support, nickel-plated shield over oil cups on body to protect clothing, nickel-plated headlights, and two lights under hood for inspecting the engine. The car is finished in ultra-marine blue, with black fenders and wire wheels. A chassis also is shown.

THE FERRIS

The six-passenger Ferris is a 130 in. wheelbase job with an aluminum, custom-built body. Five Disteel wheels are included, the spare carried on the left side. The engine is a Continental, 3½ by 5¼ in., with Splitdorf magneto and Zenith carbureter. A Borg & Beck clutch is used and the rear axle is floating. A two-unit Leece-Neville starting and lighting system is used. A volt and ammeter is placed on the instrument board to check the system at the press of a button. Burnt-out fuses are said to be impossible, because of a special type of circuit breaker.

THE NASH FOUR

So much interest has been aroused by the word that the Nash Company was to add a light Four to its line, to supplement the present Six, that the first showing of the new car at the Palace, developed into something of a reception at the Nash booth. The car is a small brother to the present Six. In every respect, it is the Nash Six except for slightly smaller size. The engine is a block, identical with that of the Six, except for its smaller number of cylinders. Cylinder dimensions are the same as in the Six. The design throughout is the same. The wheelbase is 116 in., five inches shorter than that of the Six, the tires are smaller, being 32x3½, but they are cords; the body is a strictly five-passenger one, but with plenty of room for that number. Finish and upholstering and lines are in keeping with the Nash reputation.



The Nash Four

Mechanical Tendencies Revealed at Grand Central Palace

In his review of the show, Mr. Heldt notes several marked tendencies in the mechanical design. There is the increase in the use of flexible disk type universal drive in final drive. The gain of transmission brakes. The improvement in crank case oil fillers. Increased depth of frames and the lowering of them to obtain a lower center of gravity and the development of the force lubrication system

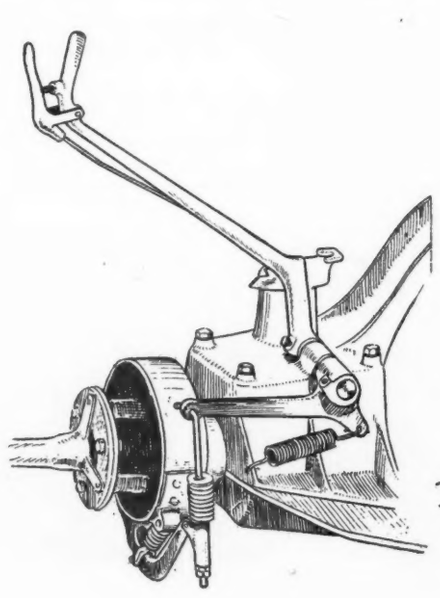
By P. M. Heldt

OWING to the fact that war conditions retarded passenger car development during 1917 and 1918, it was expected that the present show would disclose more than the usual number of changes in design and new tendencies. A careful review of the exhibits shows that this expectation was fully justified. Not only is there a considerable number of entirely new models on exhibition, but many new tendencies are observable.

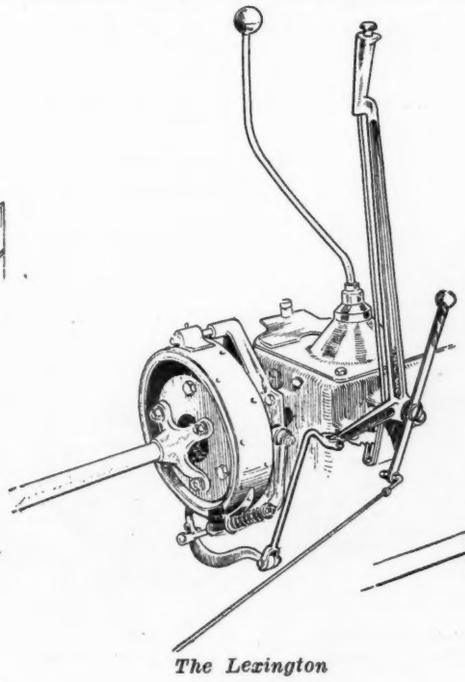
The first thing that impresses the student of design is the large increase in the use of flexible disk type universal joints in the final drive. Until a few years ago many engineers were skeptical as to the reliability of this type of universal where the angularity attains considerable values and variations in length must be allowed for. But constant improvements have been made in the disk material and in the steel washers distributing the strain, while at the same time frames have been lowered and the angularity of the drive, therefore, has been reduced. The flexible type of universal may now be considered as having passed the experimental stage and entered into direct competition with the metallic type of universal for propeller shaft use.

There is a notable gain in the use of transmission brakes, especially in low-priced cars. The development may be explained on the ground that a single brake is cheaper to manufacture than a double one, more particularly when it acts on a high speed shaft, which permits of making all parts relatively light. Among other cars having recently been fitted with transmission brakes, may be mentioned the Maxwell, Briscoe, Jackson and Lexington. On cars with unit power plants, the brake pedal is located so near the transmission brake that a very compact and simple operating linkage is possible. The brake equalizer is done away with, a moderate amount of weight is saved and the chance of rattles developing is reduced. It is very likely that the lining of a transmission brake requires more frequent renewal than would that of a pair of hub brakes, as the speed

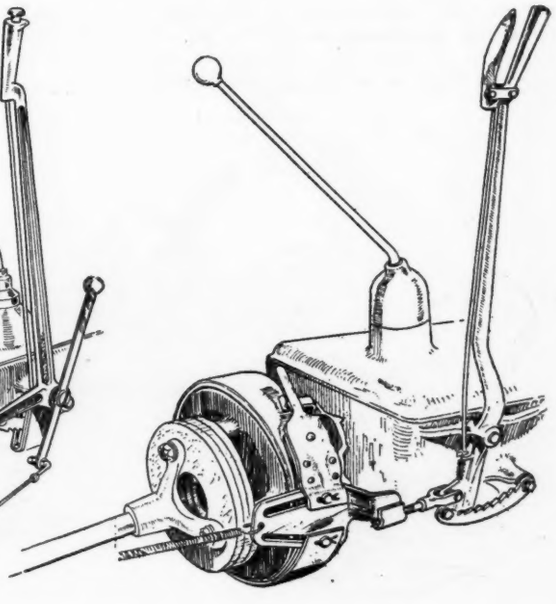
Three New Designs of Transmission Brakes



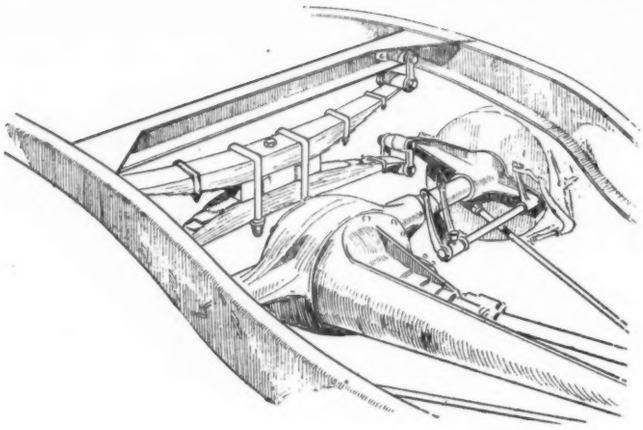
The Briscoe



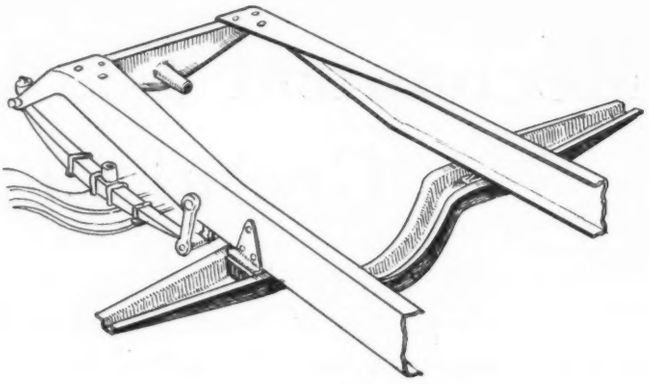
The Lexington



The Maxwell



Rear end of new Saxon Chassis, showing double cross spring and curved pressed steel tongue arm



Sketch of front end of Briscoe frame, showing pressed steel rim board brackets extending all across

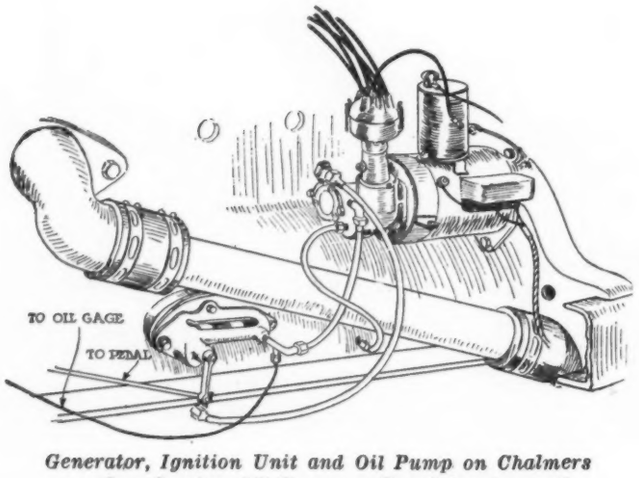
of the drum is greater and the area of the brake surface less, but then, a single brake can be relined at less expense than a double one.

There has been a commendable effort in recent years to so arrange the crankcase oil fillers that oil can be poured into them with any ordinary oil measure without spilling it all over the engine. In engines with overhead valves the oil filler and breather is often placed on top of the engine in a most accessible position. One of the objects in selecting this location is, of course, to aid lubrication of the valve rockers by the oil mist carried by the air flowing toward the breather. On engines of the L-head type the breathers are now generally brought out further from the crankcase than they were formerly. Several arrangements are illustrated. In the Buick the breather is in the form of a pipe extending out from the engine at an angle of about 45 deg. On the new Studebaker six and on the Lexington, the breather is fastened to the rear side of the cam gear housing and in each case is most accessible. It is now coming to be customary to fit the breather with a hinged cover held in the closed position by a spring. This is obviously preferable to a screwed-on cover, which is apt to be dropped into the mud pan, from which it is always hard to extract it again.

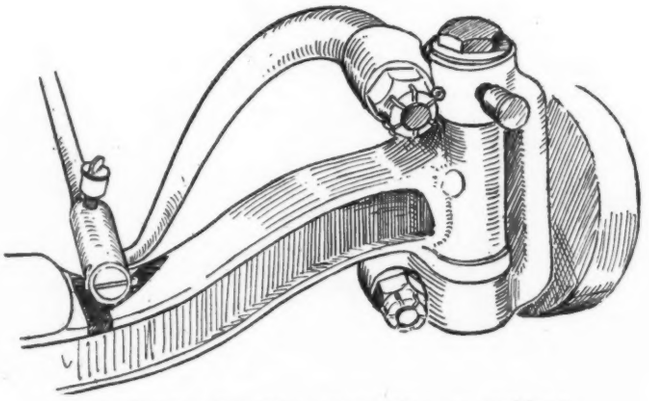
Frames are still being increased in depth of section, and some of the frames seen today would have been regarded as freakish only a few years back. Even on such a light car as the Oakland Six, a 6½ inch channel is used. Possibly the increased popularity of closed models has something to do with the prevalence of heavy frames. There are few cars on which the doors still line up perfectly with the body sides after a year's use, and the only way in which distortion can be prevented is to make the side members more rigid, that is, of deeper section. With the same end in view, the straight, tapering frame is gaining adherents, for the offset at the cowl of the bottle-necked frame has always been a source of weakness.

The tendency to lower the frame with a view to obtaining a lower center of gravity is still continuing. Buick, among others, has redesigned its rear construction in order to lower the frame. The most advanced car in this respect is probably the new Fergus, which has its cantilever inside the frame channels and has the latter cut off just ahead of the rear axle so as to obviate the necessity for a large "kick-up" in the channels over the axle. Cantilever springs may be placed directly under the frame channels, outside or inside of same. Each arrangement has something to commend it, and each is in practical use. If the spring is outside the frame—assuming the latter to be of a given width—the load on the rear axle comes very close to the wheel and the bending moment on the axle is consequently reduced. On the other hand, there is a strong twisting moment on the frame where it is supported on the middle of the spring, which must be allowed for by the provision of a substantial cross member at this point. If the spring is directly underneath the frame channel, this twisting moment is eliminated. Perhaps the best thing that can be said for the spring inside the frame channel is that it is better protected from mud and water splashed up by the wheels.

On the Fergus the springs are encased in leather boots



Generator, Ignition Unit and Oil Pump on Chalmers car, also showing Oil Pressure Regulator in section



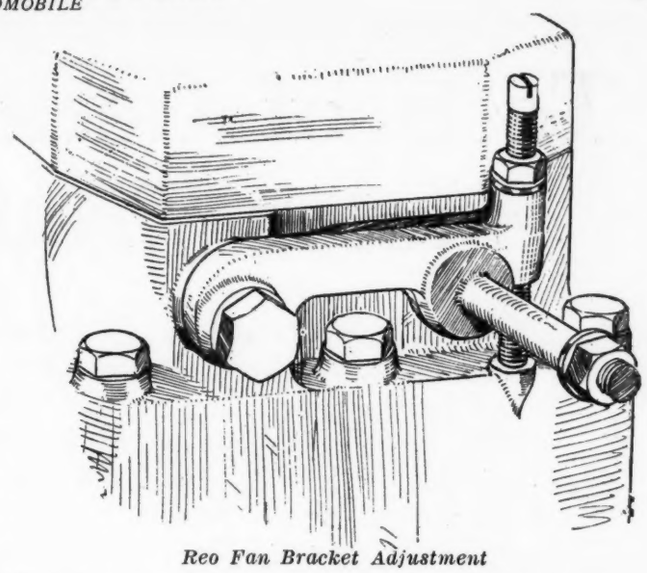
New steering knuckle construction on Oakland

and have an oil circulation system which communicates with the transmission case, in which oil lubrication is also used. On the Fergus all the attention which needs to be given to the lubrication is to add oil to the crank chamber and transmission case from time to time, all the minor bearings throughout the chassis being lubricated automatically from these oil supplies. This tends to greatly reduce the labor required in keeping a car in good working condition, and while other manufacturers are not going quite as far as Fergus, the general tendency is in that direction. Oilless bushings are used in increasing numbers in places where there is little motion. The new system of lubrication by means of a high pressure grease gun, forcing the grease directly to the bearing surfaces, is noticed on quite a number of cars.

In engine lubrication the pressure or force feed system is making constant gains over the once almost universal circulating splash system, and of the passenger models for 1920 exactly one-third have force feed. Whatever defects remain in this system are gradually being eliminated. The plain force feed generally delivers too much oil to the bearing surfaces when the engines run at considerable speed. This has been remedied by Marmon by a suction operated by-pass which removes the pressure from the oil feed when the throttle is nearly closed; by Pierce-Arrow by means of two relief valves of which one has only a light spring but on account of its small area of opening can only give partial relief, and by Chalmers by means of a relief valve the pressure on which is automatically controlled by the accelerator pedal. The Chalmers arrangement is illustrated herewith. The same sketch also shows the combination of the oil pump with the generator and ignition unit so as to simplify the drive.

While the unit power plant continues in favor, there is a tendency, especially among the manufacturers of lower-priced cars, to make the bell housing over the fly-wheel in skeleton form. When unit power plants first came into use the multiple disk-in-oil was the popular type of clutch and this necessitated complete enclosure. With the present dry disk and plate clutches, the closed bell housing serves no real purpose and represents rather a waste. If cast iron is the material used, it adds a lot of unnecessary weight, and if aluminum is used, it involves considerable cost. In all, or at least the great majority, of the models in which skeleton housing has been adopted, cast iron is the material used.

In engine construction top halves of crankcase integral with the cylinder block and lower halves of pressed steel, is coming to be standard form of construction. This was first introduced on the lowest priced car, the Ford, and is working its way up. The advantages of this form of construction are by no means limited to low cost of manufacture, though that undoubtedly is the principal one. The liability of steel to rust is a minor objection in a crankcase which is generally sufficiently protected by an oil film. No doubt the difficulty of getting aluminum during the war period helped the pressed steel construction, and now that aluminum is plentiful again, its competition to pressed steel as a material for crankcase construction may harden.



Reo Fan Bracket Adjustment

In ignition practice the battery system is now well-nigh universal. It was noticed that there is a tendency to place the ignition unit at the rear end of the engines, driving it from the rear end of the camshaft. Whether the object is to better protect it from moisture drawn by the fan through the radiator when it rains, or splashed up by the front wheels, or whether it is to simplify the control connections and the cables to the switch and battery, it is hard to say. Possibly both ends are aimed at.

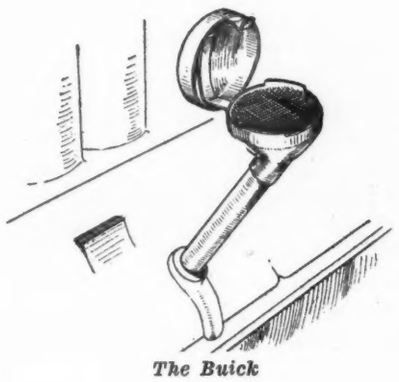
Pedals are now practically always made adjustable. It is rather remarkable what a variety of shapes and designs of pedals and pads is still in use. One should think brake and clutch pedals would lend themselves to standardization, and if the designs were standardized these parts could be manufactured by specialists in large numbers for the trade. The type of adjustable pedal that appealed to us most is that in which the pad is provided with a threaded shank which screws into a threaded hole at one end of the cranked pedal and is secured by a lock nut.

In control mechanisms for the top of the steering post, die-cast sectors and levers are coming more and more into use. These are economical to manufacture and neat in appearance, and although the friction lock has sometimes given trouble in the past, this is being overcome by using somewhat heavier springs behind the friction blocks.

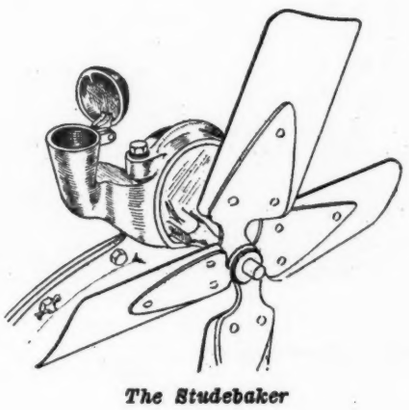
In the past, fan adjustments for belt tension were often held entirely by friction and the adjustment was apt to come loose and require frequent attention. While this construction involves an element of safety in that it does not permit of subjecting the fan bearings to enormous over-

(*Continued on page* 73)

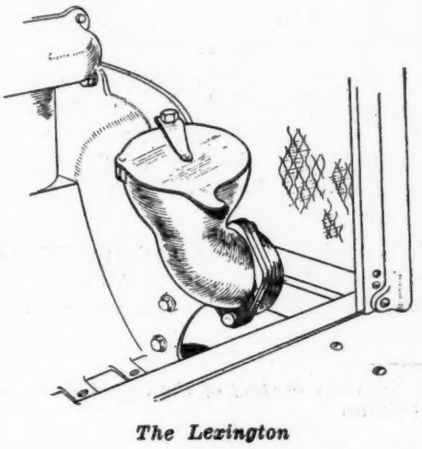
Three Accessibly Located Oil Fillers



The Buick



The Studebaker



The Lexington

Tests of German Trucks by Motor Transport Corps

Recently there was printed in Automotive Industries several articles by Lieut. Col. A. J. Slade, recently of the M. T. C., describing the trucks surrendered by the Germans to the A. E. F. These descriptions were as complete as Colonel Slade and his helpers could make with the means at their disposal in the European camps. These articles created much interest and we are very glad to be able to present a further study of these trucks.

By C. R. Hays*

WHEN the armistice with Germany was signed November 11, 1918, one of the conditions was that the Germany army should turn over to the Allies, 5,000 motor trucks in good condition. By subsequent conferences among the Allies these trucks were allocated among them. The United States was to receive 1,250 which after considerable delay were delivered by Germany.

These trucks were of many different makes and models and represented in general the standard practice in Germany as regards truck design and manufacture, modified of course by the exigencies of war and the shortage of certain types of material.

The Motor Transport Corps of the A. E. F. selected 47 of these trucks, representative of all types and makes in our possession, for investigation and study by the American Army. In the early part of 1919, they were shipped to an interior point of France and an investigation was made by the Motor Transport Corps, which of course, due to war conditions, was greatly limited in its ability to conduct purely engineering research. The trucks were subsequently shipped to the United States, and turned over to the Engineering Branch of the Motor Transport Corps at the Bureau of Standards, near Washington, D. C., where their Experimental Section is located.

For several months the Engineering Branch has been making tests and investigations of these trucks. Regular road tests were not practicable, as the trucks were in poor condition, and the character of the wheels and tires was such as to vitiate any data which might have been obtained from road runs. It was decided to disassemble partially the vehicles, to make complete measurements and descriptions of the important parts, to conduct physical and chemical analyses, where necessary, and to run block tests with the best of the engines. A portion of this work has been completed, and the remainder is under way.

In carrying out this work, the Motor Transport Corps was actuated primarily by the desire to assist the automotive industry of the country, by placing before them data on German practice in truck manufacture. We have, therefore, made every effort to give full publicity to this work. Through the courtesy of the Society of Automotive Engineers, the National Automobile Chamber of Commerce and the Motor & Accessory Manufacturers' Association, the automotive industry has been circularized and informed that these tests and inspections were going on, and has been invited to send representatives to examine the trucks. A large number of concerns have availed themselves of this opportunity, and more are expected during the coming winter.

To supplement this work of publicity and information, it has been decided to publish through business papers the results of our investigations and tests. A series of detailed articles is contemplated, dealing first with the motors and subsequently with other important elements of the trucks. Records of tests and analyses will also be made available for publication as completed.
pleted.

The first of these articles follows. Others will be printed as data becomes available.

Publicity work in this matter was initiated by Lieut. Col. A. J. Slade, formerly of the Motor Transport Corps of the American Army, who was in general charge of securing these trucks in Germany, and who has contributed to AUTOMOTIVE INDUSTRIES, a series of articles on the trucks. These articles by Colonel Slade are necessarily very general in character, and the following series of articles is intended to supplement them by giving the details of construction and operation which are of interest to the industry, and which Colonel Slade was unable to obtain.

As stated above, tests and investigations of these trucks will be continued for several months. In the meantime, the exhibition of disassembled motors and trucks will, until further notice, remain at the Experimental Section of the Motor Transport Corps, at the Bureau of Standards. The Motor Transport Corps wishes to renew its invitation to any and all representatives of the automotive industry to inspect these vehicles at their convenience.

C. R. YOUNG,
Captain, C. of E., U. S. Army,
Chief, Engineering Branch, Motor Transport Corps.

Mr. Hays is chief of the experimental section, Motor Transport Corps.

German Trucks at Camp Holabird
German Truck Engines in Bureau of Standards

The Mulag

THE motor is of four cylinders, T-head, three point suspension—4 1/16 in. bore by 5 1/2 in. stroke. The two rear points are from the upper half of the crankcase; the front point is a trunion support on the lower half of the crankcase.

CYLINDERS:

The cylinders are cast in pairs with a slight dome combustion chamber. The exhaust valves are located on the left hand side. Valve guides are of cast iron and pressed into the cylinders. Cylinder walls are 7/16 in. thick, counterbored at the bottom. Running from the outside of the cylinder walls from the bottom flange upward are four heavy webs. The bottom flanges of the cylinders are 7/8 in. thick, with six 5/8 in. holes for holding down studs. The water enters on the exhaust valve side, rises around valve seats, flows around the cylinders and is discharged directly on top of the cylinders. The water jackets run half way down the length of the cylinders. The intake and exhaust ports are individual, the manifolds being held on by studs and flanges. These cylinder blocks are interchangeable, very heavy but of good construction. Priming cups are located directly over the combustion chambers.

FLY WHEEL:

Cast iron, semi-finished all over. 20 3/8 in. dia., 4 in. width, depth of rim 1 1/2 in. Rim counterbored 3 3/4 in. for cone clutch.

CRANKCASE:

The upper half of the crankcase is of cast iron, well reinforced. Running between the crankshaft bearings and directly over the long cheeks are heavy tee construction webbing, cast integral with the case. The lower half of the crankcase is also of cast iron, with a false steel base and a very large oil sump, cast integral, holding five gallons of oil. Running along each side of the case is a web for supporting splash aprons. The crankcase joints are lapped with no gaskets.

CRANKSHAFT AND BEARINGS:

The crankshaft is a forging, machined all over. Forged integral with the crankshaft is an oil throw-off ring. The fly wheel hub is forged integral with the crankshaft. A continuation of the crankshaft 7/8 x 8 in. pass fly wheel hub is used as a clutch support. The short cheeks are 1 x 2 1/2 in., the long cheeks are 1 5/16 x 2 1/2 in. On the side of the short cheeks, next to the crankshaft bearings, are pressed sheet oil collectors; from these collectors the oil is by-passed through drilled pins to connecting rods.

The crankshaft bearings are babbitt lined, bronze backed; the front bearing is 1 7/8 x 3 in.; the center and rear bearings 1 7/8 x 3 3/4 in. These bearings are held in the upper half of the crankcase by four 1/2 in. studs, and very heavy cast iron caps. No shims used on caps.

CONNECTING RODS AND BEARINGS:

Connecting rods are drop forged offset, I beam type, semi-finished.

Connecting rod bearings are babbitt lined, bronze backed, with X type oil grooves, held in place with dowels. The bearings are 1 7/8 x 3 1/4 in. and four bolt caps—no shims. Drilled on each side of the web are two 1/4 in. oil holes, by-passing the oil to the bearings. The piston pin bearing is pressed into the connecting rod, and held in place by a 5/16 in. cap screw.

PISTONS AND PINS:

Pistons are cast iron with a very slight dome, having three 1/8 in. lap joint hammered concentric compression rings. Below the piston pin is a 1 5/16 in. oil wipe ring. On the bottom seat of this ring is an oil groove with thirty-eight 3/32 in. holes to drain the oil back into the inside of the piston. Piston is 6 1/4 in. long with the pin located 2 1/2 in. from top of piston. The piston pin is held in place by a set screw. Running around the piston at the pin is a 3/32 x 1 1/8 in. oil groove. The piston is milled off at each end of the piston pin. There is no oil groove in the skirt but a rib at the bottom with the walls 1/8 in. thick. Pistons are ground.

The piston pin is 1 1/8 in. in dia. by 5/16 in. long, hardened and ground.

TIMING GEARS:

Timing gears are of the Spur type; the crankshaft gear is 4 1/16 in. in dia., 42 teeth, 3/32 in. depth of teeth, 5/16 in. at base, 1 3/16 in. face. This gear is hardened. The intake camshaft gear is a steel forged gear and soft. The exhaust camshaft gear is a ring gear, soft steel onto a cast iron hub. These gears are held on by a straight key and nut. The water pump and magneto gears are of soft steel, these two gears being supported on two ball bearings each.

CAMSHAFT AND BEARINGS:

Camshaft is of hollow tubing with the cams forged integral with the shaft. The shaft is 1/8 in. in dia., hardened and ground all over. True cam radius 1 5/16 in. with 3/8 in. face and 3/32 in. lift. The exhaust camshaft is a sliding type with auxiliary cams opposite a point of the valve cams. This method is used for compression release.

The two rear camshaft bearings are cast iron, 5 in. long; the two center camshaft bearings are of cast iron, split, 7 in. long, with four dowel pins and four 5/16 in. bolts for holding the halves together. The two front bearings are of cast iron 5 in. long.

VALVES:

Valves are mushroom type, drilled and tapped in the head for inserting a bolt for pulling or using a valve grinding tool. Valves are 1 7/8 in. in dia., 45 deg. and 3/32 in seats, 8 1/4 in. long with a 3/8 in. stem. Valve springs are held on by small, machined caps with 1/8 x 3/8 in. straight keys through the valve stem. These valves are interchangeable. Valve caps are of cast iron, the eight caps drilled for spark plugs.

VALVE TAPPETS AND GUIDES:

Valve tappets are of the roller type with compression springs. Valve tappet body is reduced from 3/4 in. to a stem 1/2 in. in dia. The adjustment is by adjusting tappet and lock nut.

The guide is of cast iron and 3 3/4 in. long, held down by a cast integral flange and two bolts. The top of the tappet guide is large enough to be counterbored off for sliding a sleeve over for protection of the tappet body and valve stem. At the top end this guide is counter-bored, forming a large recess for collection of oil. At the bottom of this recess are three 1/8 in. drilled holes, leading back to the plunger body. This type of plunger is bad for pumping oil.

GOVERNOR:

The governor is a fly ball type, located in the hub of the intake camshaft gear, the balls being connected to a sliding collar on the camshaft behind the timing gear. Just above this is located a forked bell crank with the forks extending into the sliding collar; the other end of the bell crank is carried to the upper half of the crankcase, and from there to the governor valve by a rod.

OILING SYSTEM:

The oil pump is a two-gear pump, located on the rear end at the bottom of the lower half of the crankcase in a cast bronzed housing. This pump is driven by a shaft and bevel gear directly from the rear of intake camshaft. The oil is forced from the pump through a steel tubing conduit. Along the outside and over the top half of the crankcase there are three leads running to the three crankshaft bearings. From the crankshaft bearing the oil is collected by scuppers on the short cheeks and by-passed through drilled pins to the connecting rod bearings.

WATER SYSTEM:

Centrifugal 4 in. bronzed pump with cast iron housing. The water enters through the center and is discharged directly overhead, with a 1 in. intake and a 1 in. discharge. The pump is located on the exhaust side of the motor and is driven by gear shaft from the timing gear case.

IGNITION:

Ignition system is a dual high tension type Z. R. 4 anti-clockwise magneto. This magneto has a single contact breaker, but a double secondary distributor, making it a dual secondary without additional battery. For checking the position of the secondary rotor there is a celluloid window opposite contact number one in the secondary distributor cover. Magneto is located on left hand side of the motor, and is driven by a shaft from the timing gear case. The advance is by the customary advance of breaker box, the advance located on the dash.

CARBURETER:

Carbureter is an 1⅞ in. vertical Zenith, with a 29 mm. venturi throat. The construction of this carbureter is identical with the American Zenith. The body of the carbureter is of cast bronze, with an attachment for hot air.

FAN:

Fan 25 in. in dia., three blades. Material cast iron, cast integral with hub, having machined fan pulley on rear. Fan blades cleaned and enameled. Fan hub keyed to tapered end of fan shaft which is mounted on ball bearings. An adjusting collar screwed into fan bracket holds shaft in place. Fan bracket is of cast iron having a flange with one U shaped slot in bottom and one L shaped slot, starting at side and finishing at top. Fan belt is tightened by the use of long thumb screw.

WEIGHTS:

Connecting rod and piston complete, 14 lbs. 5 ounces.
Valve tappet assembly, 1 lb. 2 ounces.
Valves, 8 ounces.
Valve spring, 5 ounces.

REMARKS:

This motor is very heavily constructed throughout, all parts being of large dimensions. It would not make a very good service job, for the reason that to adjust the connecting rods and crankshaft bearings, it must be completely disassembled from the frame and torn down. The suspension is by two points on the upper half of the case in the rear, and a third point in the front on the lower half of the crankcase. The timing gear is bolted onto the upper half of the crankcase, first sliding over the studs, and the long trunion bearing support in the lower half of the crankcase requiring a great amount of unnecessary work. This motor like the majority of others has the upper and lower halves of the crankcase, timing gear case, manifolds, guides, fan brackets, fan, water pump housing, valve caps and crankshaft bearing caps of cast iron. One of the best construction features is the cylinder block castings. Very few parts are of finished workmanship; practically everything is left rough.

The Hansa-Lloyd

THE motor is L-head, four cylinders, four point suspension, suspended from the upper half of the crankcase. 4 5/16 in. bore and 5⅞ in. stroke.

CYLINDERS:

Cast in pairs with the valves on the right hand side of the motor, carbureter and exhaust ports on the same side. The water enters on the opposite side of the valves; being baffled, it flows and rises around valve seats, and is discharged on the top of the cylinders, with large water areas around the cylinder walls. The valve seats have very little water area around them with practically no water area around the valve guides. The valve guides are cast integral with the cylinder castings. The combustion chamber is flat head type, there being no counterbore in the chambers. The cylinder walls are ⅜ in. thick, and counterbored at the bottom. The cylinder casting is made so that the valves are enclosed for protection by using a plate. The cylinder heads are heavily cross-webbed over combustion chambers. The ports are symmetrical and smooth, both on the intake and the exhaust, as though they had been sand-blasted. There is a detachable plate on top of the cylinders which is held down by two studs to each plate, each stud being drilled and used as priming cup inlet to the cylinders.

FLY WHEEL:

The fly wheel is of cast iron, semi-finished, 20 in. in dia., and 3¾ in. wide. Rim ⅞ in. thick. The rim of wheel is drilled and tapped with cone clutch flange.

CRANKCASE:

The upper half of the crankcase is of cast iron construction and carries the crankshaft bearings, with no special features excepting that it is very heavily webbed at the three bearings, and has two inspection holes for the adjustment of the rod bearings. The lower half of the crankcase is also of cast iron with walls ⅛ in. thick. In the lower half of the case is located the oil sump, which holds 2½ gals. of oil; also a large inspection plate, which can be taken off when cleaning the case. The joints on the upper and lower half of the crankcase are lap joints, no gaskets. The cases are held by two large dowel pins and thirty-six ⅜ in. bolts.

CRANKSHAFT AND BEARINGS:

The crankshaft is of drop forged construction, machined all over with forged integral fly wheel hub. The cheeks next to the crankshaft bearings are 1 3/16 x 2 7/16 in. The two cheeks between the connecting rod bearings are 1 3/32 x 2 7/16 in. Instead of being the customary 190 deg. right angle, these cheeks are set on an angle of approximately 160 deg. The cheeks are drilled for oil conduits to the rods, leading from the main crankshaft bearings.

Crankshaft bearings are babbitt lined and steel backed, held in place by heavy forged caps and 2⅝ in. studs on front and center bearings. The front and center crankshaft bearings are interchangeable, being 1⅞ in. in dia. by 3⅜ in. long; the rear crankshaft bearing is 1⅞ in. in dia. by 3⅝ in. long; the caps being held down with two ⅞ in. studs. The fly wheel flange is forged integral with the crankshaft. Continuation of the crankshaft forms a 1¼ x 5 in. spindle, which acts as a clutch pilot spindle. Forged integral with the crankshaft are two rings, which prevent the oil from following along the crankshaft and being wasted. One of these rings also acts as a thrust bearing for the crankshaft.

CONNECTING RODS AND BEARINGS:

Connecting rods drop forged, I beam, semi-finished, cap held on by four 7/16 in. bolts.

The bearings are babbitt lined, bronze backed, held in place by dowel pins. The upper half of the bearing carries two oil grooves and the lower half carries three. The piston pin bearings are babbitt bushings pressed into the

rods, the rod being milled at the upper end with an exceptionally large slot for collection of oil and for lubrication of the piston pin.

PISTONS AND PINS:

Pistons, dome type, 5¾ in. long. There are four lap joint, 1/16 in. hammered, concentric, compression rings. In the skirt, which is ⅛ in. thick, there are two 1/16 in. oil grooves and just above them, under the piston pin, is another 1/16 in. ring used as an oil wipe ring. Around the piston at the piston pin there is a large groove 1/32 x 1/16 in. Pistons are ground.

The piston pin is 1 1/16 in. in dia., hardened and ground, held in place by a set screw with the center pin 3 in. from the top of the piston.

TIMING GEARS:

Timing gears are the Spur type, and of soft steel, excepting the idler gear, which is of cast iron. Timing gear on the end of the crankshaft is pressed on the crankshaft and held by a straight key; it is 3 1/16 in. outside dia. with twenty-four teeth, ¼ in. deep, 1/16 in. thick at the base of the tooth and 1 1/16 in. face. The timing gear on the end of the camshaft is a ring gear, bolted to a steel hub, which is pressed on the end of the camshaft and held in place by a straight key and nut. On this hub is located the governor.

CAMSHAFT AND BEARINGS:

The camshaft is a drop forging with the cams forged integral with the shaft, the shaft being 1 1/16 in. in dia., hardened and ground all over, and supported by three plain type, solid bronze bushings. The true circle of the cam is 1¾ in., having a face of ⅞ in. and a lift of ⅜ in.

Three bronze sleeve bearings are used pressed into the crankcase. At the center camshaft bearing is forged integral a large boss, which allows center bearings to be large enough to be slipped over the cams.

VALVES:

The valves are of the mushroom type, 2 1/16 in. in dia., 30 deg. seat, 3/32 in. wide, 8 1/16 in. long with a 1/16 in. stem on the end and a very heavy fillet at the head of the valve. The valve springs are held in place by very heavy machined spring caps, the caps being held in place by ⅛ x 1/16 in straight keys and holes broached through the ends of the valve stems. The valve caps are of malleable cast iron, screwing into the cylinder 1¾ in. from the shoulder. This forms a very deep pocket for the plugs to set in. The plugs are tapped for metric spark plugs and can be only gotten out with a special wrench. Gaskets are used on these plugs for a tight joint. The valves are protected from dust and grit.

VALVE TAPPETS AND GUIDES:

The valve tappets are the mushroom type, hardened and ground. The cam contact end is milled on each side, forming two flat sides, which work in the forked tappet guides to prevent the tappet from turning. Tappet body proper is 1 1/16 in. in dia. The adjustment is by adjusting tappet and jam nut, the adjusting tappet being hardened.

The valve guides are 4 in. long and of cast iron, held down by crow feet, forged out of flat stock.

GOVERNOR:

Governor is fly ball type, located on the end of the camshaft, the fly balls held in place by pins running through bosses on the hub of the camshaft timing gear. The motion is transmitted through a sliding shaft on the continuation of the camshaft, this being carried through a collar and a yoke outside of the timing gear case, and from there to the governor valve on the carbureter manifold.

OILING SYSTEM:

Forced feed system with gear driven pump, driven by a spiral gear off the camshaft. This gear is milled from a forged integral boss on the camshaft. The pump is located in the sump, where it forces the oil up to a conduit, leading the full length of the upper half of the crankcase. The webs are drilled for by-passes for conducting oil from conduit pipe to the main crankshaft bearings. There are also drilled webs conducting oil from the conduit to the three plain camshaft bearings. Balance of lubrication of the motor and timing gears is by vapor oil from the case.

WATER SYSTEM:

Centrifugal impeller pump, the impeller being cast bronze and the housing of cast iron, with the intake through the center 1⅛ in. and a discharge of the same size. The impeller is 4 in. in dia. with eight ¾ in. wide blades. The pump is located on the right hand side of the motor, and is driven by a coupling from a cross-shaft, which is driven by worm and spiral gear from the camshaft. The other end of this shaft drives the magneto, which sets crosswise of the motor.

IGNITION:

A single system, high tension type, F. E. 4 D. Mea magneto. The magneto is clockwise and the advance is by advancing the magnetic field in a direction to the rotation of the armature. The magneto is placed on the right hand side of the motor, sitting transverse, and is driven by a cross-shaft, which is driven by a spiral gear off of the camshaft in rear of the camshaft timing gear. The high tension wires are enclosed in a fibre tube, which is bolted onto the side of the cylinders. For checking up the position of the secondary distributor rotor, there is placed in the secondary distributor cover a celluloid window opposite contact for Number One cylinder.

CARBURETER:

Carbureter is a vertical Pallas type V, 1¾ in., with a 29 mm. venturi throat. The float is of cork and shellac. The idler adjustment is by a stationary well. Carbureter is of cast aluminum and has a hot air attachment. The high speed is through a well, running angular through the venturi, the fuel being restricted by a compensator. Throttle valve is a butterfly type.

FAN:

Fan is 23 in. in dia. Four blades. Material, sheet steel. Riveted to steel casting with machined fan hub. The fan shaft is mounted on a single roller ball bearing with an adjustment screwed into fan hub. The fan bracket is made of steel casting, having a clamped end with ⅛ in. slot. The fan shaft is an eccentric, having 2⅛ in. hexagon nut machined integral with shaft. This nut is clamped into fan bracket and held in place by clamp bolt.

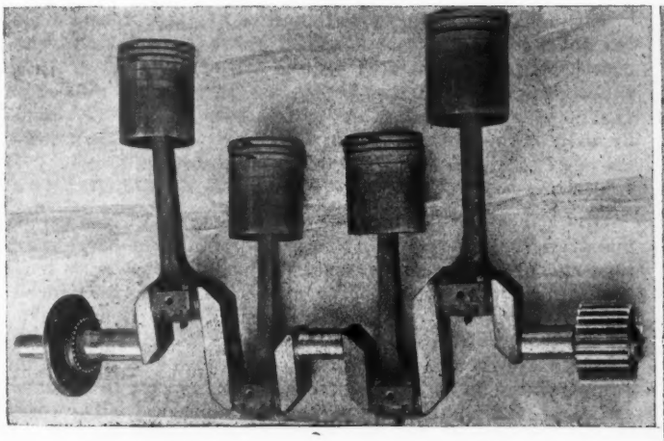
WEIGHTS:

Connecting rod and piston complete, 13 lbs. 14 ounces.
Valve tappet assembly.
Valve, 10 ounces.
Valve spring, 6 ounces.

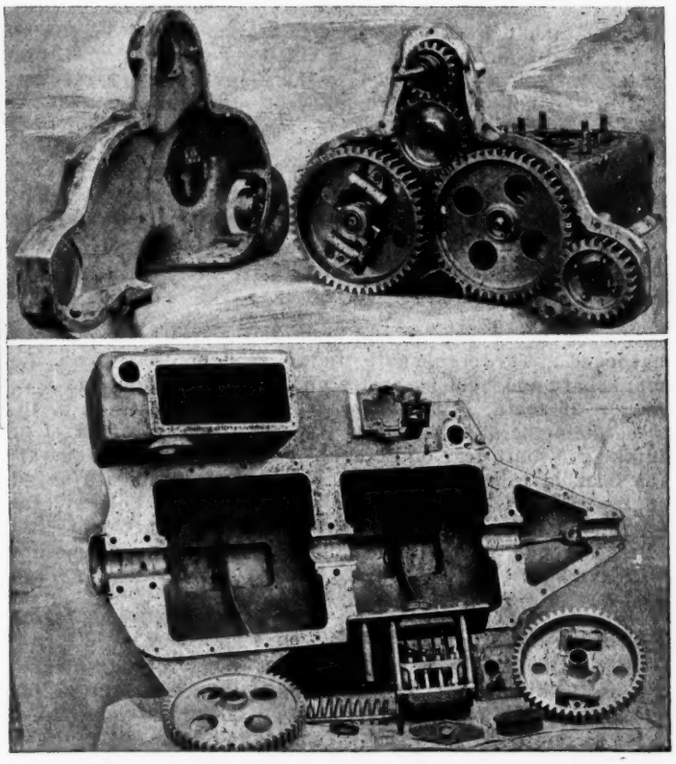
REMARKS:

This motor is a good production job and reasonably good for service, as all parts are very easily reached, excepting the connecting rod bearings, which are supposed to be adjusted by very small port holes in the upper half of the crankcase. To drop the lower half of the crankcase, it is necessary to move the timing gear case. When this is done, the crankshaft bearings and rod bearings can be readily gotten to. The valves are very easy to get to and the cylinders easy to disassemble. The exhaust and intake manifolds are of cast iron construction, the intake having good, symmetrical lines. Both manifolds are held onto the cylinder by studs and flanged joints. Workmanship upon this motor shows no finish, only the valve, connecting rods and pistons being interchangeable. All outside surfaces of the motor and other parts are in the rough states.

The Graff & Stift



Crankshaft, connection rods and pistons



Timing gear cover. Upper crankshaft and timing gear assembly. Lower half of crankcase—timing gears, oil pump-valve assembly. Valve cap and holding down foot

THE motor is four cylinder, T-head, cast in pairs, 4¾x5½ in. bore and stroke. Four point suspension with arms cast integral on oil pan.

CYLINDERS:

Cylinders are held down by six ½ in. studs. Combustion chamber is flat type counterbored. Cylinder walls are ⅜ in. thick and chamfered at bottom. Valve guides are 4¾ in. long, cast iron and screwed into cylinders. The valve tappet guide boss is counterbored 1¾ in. in dia. by ¼ in. deep and used as a retainer for valve spring. A single port for two valves used for intake, and separate port for each exhaust. Both intake and exhaust passages are clean and sandblasted. Web boss on the intake passage is drilled and tapped for stud holding intake manifold. The water enters on the exhaust side between the exhaust passages, rises around the valve seats, and is discharged on top of the cylinders. Water jacket extends ¾ in. of the way down length of cylinder. Water area is exceptionally large around both valves and completely encircles cylinder walls. Priming cups are located directly over the combustion chambers. Exhaust manifold cast iron, having flanged rectangular openings, cast in pairs, integral with manifold. Manifold is bolted to cylinders by six ⅜ in. studs. On the second and fourth exhaust passage of manifold there is a small baffle plate cast on the front end and extending towards the rear, in neck of opening.

FLY WHEEL:

Two-piece. Cast iron castings, machined all over, dia. 18 in., width 4 in., rim 1½ in. thick, counterbored 3¾ in. deep. Cast iron spacer which is bolted to fly wheel rim is machined for inverted cone clutch.

CRANKCASE

Crankcase is one-piece aluminum casting, heavily ribbed allowing the gas to continue towards rear of manifold, after it is exhausted from the cylinders. Intake manifold is of cast aluminum, with the governor butterfly valve assembled and reinforced at the bearings, with oil pockets cast in ribs on both the camshaft and crankshaft bearings. The top wall of crankcase, which holds the cylinders, is very thin but heavily ribbed between cylinder openings. Flanged openings on right hand side of case are used for inspection.

CRANKSHAFT AND BEARINGS:

Crankshaft is a masterpiece. It is a steel forging, finished all over, having fly wheel flange and a 4 in. continuation of crankshaft forged integral on rear, while in front the shaft is extended 3½ in. beyond front bearing, drilled 1 5/16 x3¾ in. deep. Starting crank jaw of 4 teeth, machined on front of crank. Short cheeks are 1¼x2⅜ in.; long cheeks are 1 7/16 x2½ in. Fly wheel is bolted to fly wheel flange and held in place by four ⅞ in. bolts.

Bearings are babbitt lined and bronze backed; upper half carried in the upper half of crankcase; lower half in the lower case. The upper half of bearings have X type oil grooves, while the lower half are plain and held in place by dowel pins. The front crankshaft bearing is 2 in. in dia. by 3⅜ in. long; the center bearing is 2 in. in dia. by 3¼ in. long, and the rear bearing is 2 in. in dia. by 4⅜ in. long. The thrust of crankshaft is taken by a ball thrust bearing located between the fly wheel hub and the rear end of the crankcase. No shims are used on these bearings.

CONNECTING RODS AND BEARINGS:

Connecting rods are offset, drop forged, I bean type, machined and finished all over. The cap is held in place by four ⅜ in. bolts. No shims are used, the joints being lapped. Connecting rod cap has an oil scupper ⅛ in. in dia., made of copper tubing, elbow shaped and soldered in place. A ⅛ in. oil hole, ⅝ in. countersunk on both ends, is drilled at assembly through center of big end between cap bolts, with cap and bearing in place. This hole is located on cut of upper and lower halves. There are two ⅛ in. oil holes countersunk one on each side of I section of rod, drilled at an angle to center of bearing on upper half of big end.

Connecting rod bearings are babbitt lined, bronze backed, 1 13/16 in. in dia., 3 5/16 in. long, and held in place with a hollow dowel. For both upper and lower halves of babbitt bearing there is an X shaped oil groove with oil hole drilled in center; babbitt is locked into the bronze back by a V shaped recess cut into the bronze at each end.

There are three oil grooves, top one being located 1¾ in. from top of piston, while the second and third are spaced ⅝ in. apart from the top one. The skirt is 3/32 in. thick, with a ⅛x¼ in. rib at the bottom of the skirt. In the inside of piston under the head are cross type ribs, the horizontal rib meeting the piston pin boss while the vertical runs into a rib that connects the two piston pin bosses on both sides. The piston pin is of steel tubing, tapering from 1 1/16 in. to 1 3/16 in. and held in piston by a small set screw at small end is a bronze sleeve, pressed into the upper end of connecting rod; no oil hole provided for lubricating piston pin.

PISTONS AND PINS:

Pistons are cast iron, flat head, 6 in. long with three ¼ of piston pin. The set screw hole is drilled and tapped at assembly of piston pin and piston, the hole being located on outside of piston pin, so as to form a lock in piston. Piston pin is located 2⅜ in. from top of piston.

TIMING GEARS:

Timing gears are of the spur type, steel forgings not hardened. The crankshaft timing gear is pressed on the crankshaft and held by a straight key, 4¾ in. outside dia., having 25 teeth, ⅜ in. deep, 3/32 in. thick at base of tooth. Face diameter of this gear is 2⅞ in., allowing for offset of intake camshaft gear on account of governor fly balls operating back of camshaft gear. Two camshaft gears are keyed to tapered shaft and held in place by castle nut. Water pump gear bolted to flange, having a coupling in front. The idle gear is driven by the exhaust camshaft gear and meshes with fan shaft gear, which is mounted on ball bearings and centered in a retainer on front end case cover.

CAMSHAFT AND BEARINGS:

Camshafts are drop forgings with cams forged integral 1⅛ in. in dia., hardened and ground all over. True radius of cams is 1 1/16 in. dia., ½ in. wide on inlet cam, 1/16 in. wide on exhaust cam and 1/32 in. lift. Each camshaft is mounted on four bearings, the rear bearing on each shaft being cast iron, the centers bronze sleeves, and the front end bronze casting. On the exhaust cam a compression relief is machined at 90 deg. from top of lift on cam. The exhaust camshaft is of sliding type with grooved recess machined in center of shaft and shifted by an L shaped lever, having a hardened steel catch on end which fits into groove on camshaft. This lever operates in bronze bushing on top of crankcase, and is held in place by an aluminum cap. An oil pump gear of bevel type is keyed to rear end of exhaust camshaft and held in the rear end bushing by set screws, which fits into a groove machined on hub or gear.

VALVES:

Valves are mushroom type, crown head, 2½ in. in dia. with slot in the head used for grinding the valves. The valve seat is 45 deg. with 3/16 in. wide seat. The valve stem is 8¼ in. long by ⅜ in. in dia. Valve springs are held on by a machined cap and 3/32 in. by 1⅛ in. flat pin, which fits in an elongated hole in the valve stem, and in a groove on bottom of spring retainer. The valve caps are of cast iron, having a recess ⅞ in. deep in the head, with cross shaped ribs connecting from the outer edge to a ⅞ in. boss in center. The bottom of the exhaust valve cap is flat, while the intake is convex and drilled and tapped for metric spark plugs. There are no threads on these caps, they are held down in pairs by steel forged dogs with ends machined to fit into 7/16 in. counterbored hole in valve caps. The dog is held down by 7/16 in. stud and plain nut. Valves are not protected from dust or grit.

VALVE TAPPETS AND GUIDES:

Valve tappets are of the roller type with rollers mounted on a hollow steel stem having a threaded end and tapered shank on top. An adjusting screw with hardened hexagon head is screwed on the inside of valve stem, and locked in place by a large hexagon nut, having a machined surface, which fits over tapered portion of valve stem; this has four 1⅛ in. slots. The adjusting screw is thereby clamped securely. Valve tappet body is ⅞ in. in dia. and 3 in. long. Tappet gudes are of cast iron, with a two-bolt flange cast integral and finished all over. Inside of body is recessed for oil and an oil groove runs around it ¼ in. from top of inside with a slight chamfer at top.

GOVERNOR:

Fly ball type with fly ball bolted to outer face of intake camshaft gear; fly ball operates through camshaft gear on rear end and is connected by two coil springs. The fly balls are operated on a sliding sleeve, which fits over hub of camshaft gear; this sliding sleeve has two grooves for arms of fly ball, the outer groove for shifting yoke and levers, which are assembled in front end of gear case cover.

OILING SYSTEM:

Oiling system is combination forced feed, plunger type pump and splash system. Pump is driven by a bevel gear off then end of the exhaust camshaft, and is meshed with a bevel gear pinned to a shaft having an eccentric dog on end. This dog is assembled in a cast iron bracket with flange, bolts on the inside of oil reservoir, and has a machined boss which fits into crankcase. The oil is supplied by a four plunger pump located in an oil reservoir, which is cast integral with oil pan. This pump draws the oil from the oil reservoir, forcing oil through leads to upper crankcase in front end gear cover. The oil pump is driven by a worm gear and shaft, having a flange with eccentric opening fitting into dog on shaft, driven by camshaft gear, on rear end of camshaft. Balance of motor receives its oil by vapor and splash and by oil scuppers on connecting rods.

WATER SYSTEM:

Water pump is a centrifugal pump, 5½ in. in dia. with bronze impeller and aluminum body; water enters in center of pump and is discharged directly overhead. The intake is 1½ in. in dia., the exhaust 1⅜ in. Water pump body is mounted in front of gear case cover and connected to driving gear through coupling.

IGNITION:

Ignition system is a single system hight tension type A. U. 4 Bosch magneto. Magneto is clockwise, the advance and retarding is by conventional way by advancing the breaker box. For location of secondary rotor a celluloid window is placed opposite contact No. 1 in the secondary distributer cover. The magneto is located on the left hand side and is driven by a coupling with flexible steel plates. This makes a flexible coupling, driven by a gear, meshing directly into the camshaft gear.

CARBURETER:

Carbureter is a 1¾ in. vertical Zenith. Construction of this carbureter is identical with American Zenith.

FAN:

Fan is 21 in. in dia., four blades, material—sheet aluminum, riveted to an aluminum hub, cleaned and polished. Fan shaft is mounted in a long sleeve, fitted into gear hub. and centered on ball bearings, with adjustment screwed in rear of hub. Fan is driven by a spur gear meshed with idler gear in front gear cover. No adjustment is necessary.

WEIGHTS:

Connecting rod and piston complete, 15 lbs.
Valve tappet assembly, 1 lb. 2 ounces.
Valve, 10 ounces.
Valve spring, 7 ounces.

REMARKS:

This motor, while of good design, is not a service proposition; in order to adjust crankshaft bearings the motor has to be completely disassembled. The crankcase is well designed, walls being very light, but well ribbed. Oil pan is aluminum casting, very heavy, heavily ribbed, and carries a separate compartment with an oil level and drain for the front end gears. There is also a bronze bearing which supports, when bolted to front end cover, the starting crankshaft. Magneto bracket is also mounted on cheek of oil pan. The connecting rods are easily reached through inspection plates on side of crankcase. The workmanship is good.

The Komnick

THE motor is of four cylinder, 3 1/8 x 5 1/2 in. bore and stroke. Three point suspension.

CYLINDERS:

T head, cast in pairs, with 5/8 in. chamfer inside base of cylinder walls. One exhaust port to each cylinder block, having 7 sq. in. of area and set at a 30 deg. angle towards rear of cylinder. Slight dome combustion chamber. Water enters on exhaust valve side and is discharged overhead in center of cylinders. The water area is very large, with jackets extending 3 in. from base of cylinders. The valve guides are cast integral with the cylinders. Priming cups are over combustion chambers.

FLY WHEEL:

Fly wheel is of cast iron, keyed to crankshaft by two straight keys and two round keys. The dia. is 19 1/2 in. with a rim 2 3/4 in. wide by 1 3/4 in. deep. It is machined to a depth of 2 in. on the inside. Rim of fly wheel is drilled and tapped for clutch lining flange, which is in two pieces.

CRANKCASE:

Upper and lower half of crankcase has cast iron lapped joints, with no gaskets or special features excepting very heavily webbed sections supporting the crankcase bearings. The two front supports are the foot type on the upper half of the crankcase, and the rear support is a trunion over upper rear crankshaft bearing, which is connected by a cross member of the frame.

CRANKSHAFT AND BEARINGS:

Crankshaft is a drop forging, machine-finished completely. Short cheeks 1 5/8 x 2 3/16 in.; long cheeks 1 3/16 x 2 3/16 in. On side of cheeks are sheet steel oil collectors for passing the oil through drilled cheek pins to connecting bearings.

Crankshaft bearings are babbitt lined, bronzed backed type. Front bearing 1 3/4 x 2 1/2 in.; center 1 3/4 x 3 1/2 in.; rear 1 3/4 x 5 1/4 in. Front and rear bearings carried in upper and lower half of crankcase.

CONNECTING RODS AND BEARINGS:

Drop forged, I beam offset, semi-finish, no scuppers, no shims, babbitt lined, bronze backed, Marine type, 2 bolt caps, 1 5/8 x 2 1/2 in. rod bearings, with two oil grooves X type in upper half and one straight groove in lower half. Two oil collector holes, 1 being drilled on each side of the connecting rod. Bronze bushings for piston pin bearings.

PISTONS AND PINS:

Pistons cast iron, dome type, 4 1/2 in. long with 3 1/4 in. lapped joint, concentric, compression rings. Skirts of pistons 3/32 in. thick, pin being set in the center of the piston, with an oil groove in the bottom of the skirt. Pistons have been ground.

Piston pins are the hollow type, 7/8 in. in dia. and locked —regular set screw method.

TIMING GEARS:

Spiral type. Crankshaft gear soft steel, machine-finished with starting clutch, 1 in. face, 3 1/2 in. in dia. and 20 3/32 in. teeth. Bronze spider gear on exhaust camshaft and bronze ring, steel center gear on intake camshaft. Water pump gear soft steel, spiral type, 1 in. face, 2 3/8 in. dia., with 13 teeth. Magneto gear same as on crankshaft.

CAMSHAFT AND BEARINGS:

Camshaft and cams forged integral with 1 in. dia. of shaft, and three plain, bronzed bearings. Cams 5/16 in. face and 1/4 in. lift.

The center of camshaft bearing consists of a bronze sleeve large enough to slide off over the cam. Front and rear also bronze sleeve.

VALVES:

Mushroom type, 2 1/4 in. in dia., 3/8 in. stem, 6 13/16 in. long with 45 deg. seats and 1/8 in. wide. The stems have 1/8 x 1/2 in. broached holes for straight key lock to hold a valve spring cap. The valve spring cap is one piece, machined out of solid stock. The valve caps are made out of bronze castings with copper reinforced gaskets. These caps are 2 3/8 in. in dia. by 1 3/4 in. from the shoulder to the base of the caps. Valve plugs are tapped for metric spark plugs.

VALVE TAPPETS AND GUIDES:

Valve tappets are of the roller type, tappet body, steel tubing—upper end threaded inside and out with 1/4 in. taper above outside threads. Four 3/32 in. slots cut in the threaded end. When the adjusting tappet is in position, the lock nut on the outside is screwed down on the tappet, clamping the adjusting tappet. Valves are protected by covers.

Valve tappets work in 3 in. cast iron guides, held down by cast integral flange and two studs.

GOVERNOR:

Governor fly ball type, located on the front end, and assembled in the intake camshaft gear. There is a sliding collar on the camshaft, between the gear and the camshaft, which is operated by forks from the governor, and from the collar extends a bell crank arm, which goes through the timing gear case, and carries connection for the control rod to the carbureter.

OILING SYSTEM:

Oiling system is a forced feed, four plunger oil pump with three leads to crankshaft bearings. The pump is located on the front end of the motor in a cast integral reservoir, with timing gear case, worm and gear driven from exhaust camshaft gear. The pump is very simply constructed, having only four plungers, which are mechanically operated with no springs or check valves, the oil being drawn in by a locking sleeve valve, which opens to admit oil to all four plungers, then closes after these plungers descend towards their seats, compressing the oil through drilled by-pass holes in the timing gear, which registers with by-pass holes in the upper half of the timing gear case. From this there are three leads leading to three crankshaft bearings, and the other lead is a by-pass going to the pressure gauge on the dash. The lubrication of the timing gears is by collection of vapor oil, which comes through two port openings into the crankcase.

WATER SYSTEM:

Water system is a combination forced feed and thermo-syphon, the pump being a 4 in. six blade, bronze impeller, cast iron housing pump, with an intake opening of 1 in. It is located on side of the motor, and is driven by gear from timing case and shaft.

IGNITION:

Ignition system is a single system high tension type Z. 4 Bosch magneto. Magneto is clockwise; the advance and retarding is by the conventional way by advancing the breaker box. For ease in starting additional breaker is used for a battery system, although the magneto and battery high tension are carried through the same secondary distributer and wires. The magneto is located on the right hand side of the motor, and is driven by a shaft from the timing gear case. The secondary wiring is carried in a fibre tube, bolted onto the side of the cylinders. For checking up the secondary rotor a celluloid window is placed in the secondary distributer cover, opposite contact number one.

CARBURETER:

Carbureter is a vertical Pallas type, V, 1 3/4 in. with an 29 mm. venturi throat. The float is of cork and shellac. The idle adjustment is by a stationary well. Carbureter is of cast aluminum with no special features. The high speed is through a well running at an angle through the venturi, the fuel being restricted by a compensator. The throttle valve is a butterfly type. Carbureter has a hot air attachment.

FAN:

Fan 19 1/2 in. in dia., 3 blades; material sheet steel; rivited to steel hub, with a machined fan pulley on rear end. It is mounted between the radiator and dash on a bracket

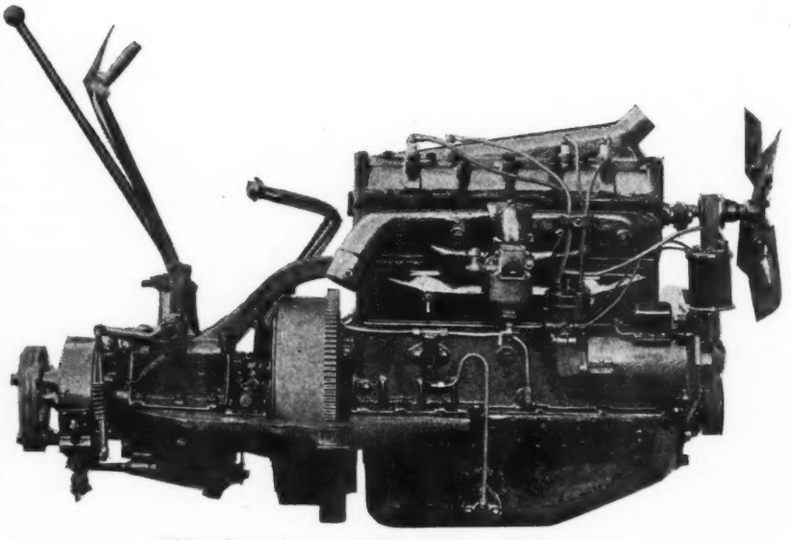
(*Continued on page* 79)

New Briscoe Has Notable Production Feature

There is much that is interesting in the changes made in the Briscoe model by Jules Haltenberger, whose orders were to make it a production job, as far as consistent with performance. The results of his work is seen in many features and the cost of necessary tools and other equipment is lessened and the service men will rejoice at the standardization features

IN refining the Briscoe car for 1920, the job was turned over to Chief Engineer Jules Haltenberger, who was given a free hand to develop it from a production standpoint to the greatest possible extent consistent with the desired performance standard. The result is a car which contains a number of manufacturing features of unusual interest.

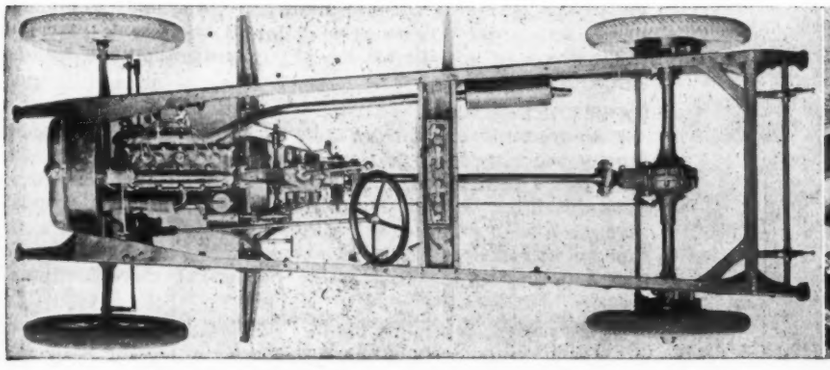
The number of drill sizes, taps, stampings and material specifications have been remarkably reduced. For example, only one design of spring shackle is used. All spring bolts are of identical dimensions, and because the drive is taken through the springs, the load on the bolts at the front end of the rear springs is the greatest and determines the dimensions of all bolts. Rights and lefts have been eliminated to an unusual degree. The use of identical parts for both sides of the car is advantageous in purchasing; it greatly reduces tool cost and at the same time enables the dealer to carry a complete stock of parts with much less investment. Another notable example of saving on material and tools is found in the spring horns and spring brackets, which are alike on both sides of the car.



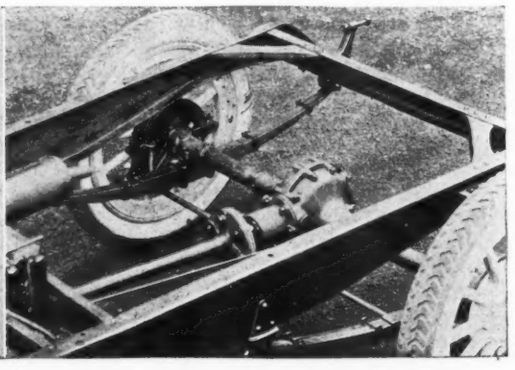
Side view of new engine used on Briscoe car

The front fender irons are alike; clutch and brake pedal forgings are identical; both clutch shafts and brackets are the same; the rear axle center castings are alike; the propeller shaft front and rear ends are identical, making the shaft reversible, and only one size of step bracket is used.

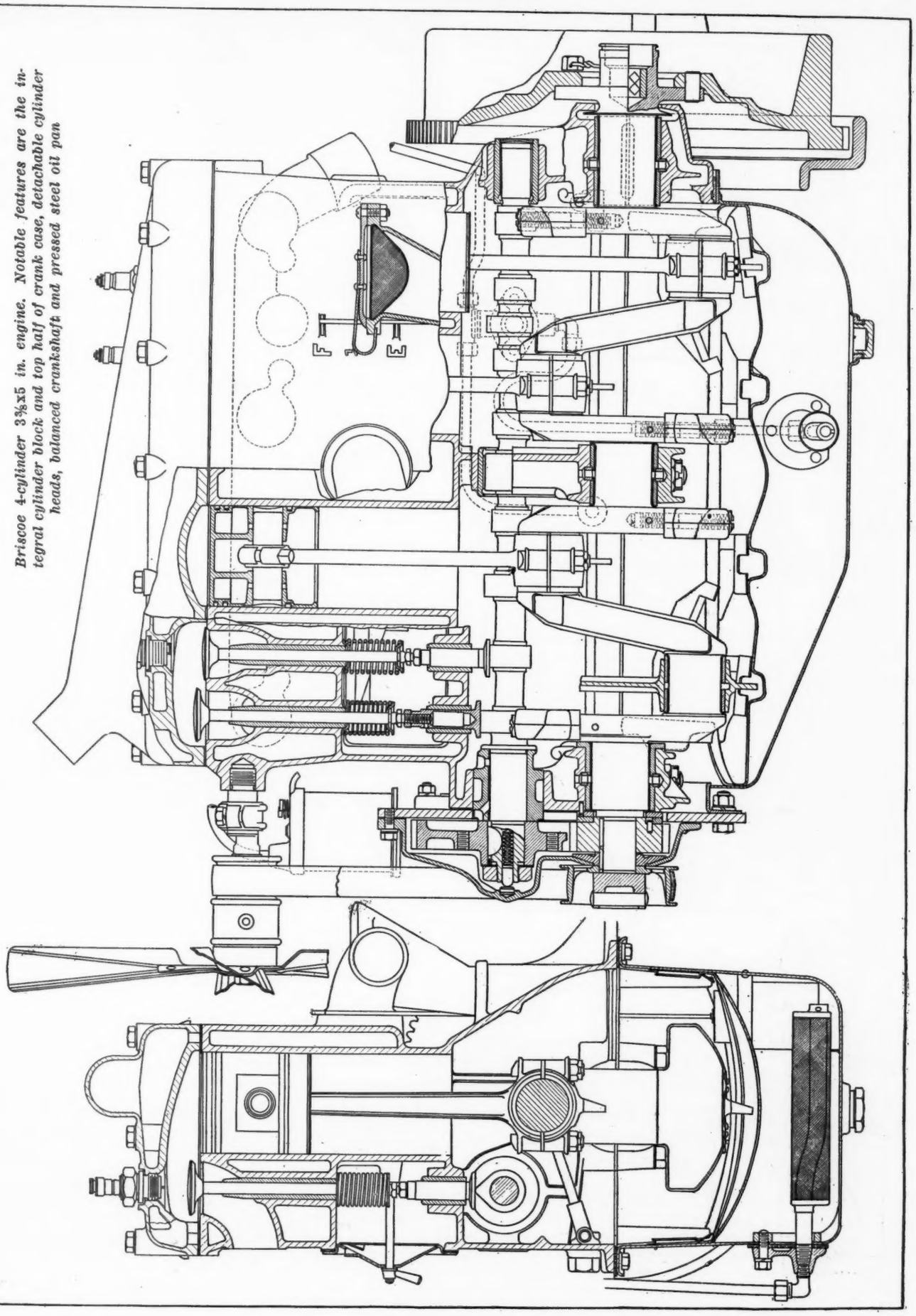
In order to cut down the number of drill sizes, some rather unusual steps have been taken. For instance, the oil return holes of the valve chamber are made the same size as the base hole of the crankcase top, and both are drilled by the same drill in the same operation. In fact, all of the Briscoe inspection gages have a specially large milled face on their handle so as to indicate the various uses for which the same gage is designed. This reduction of the number of inspection gages is a material benefit.



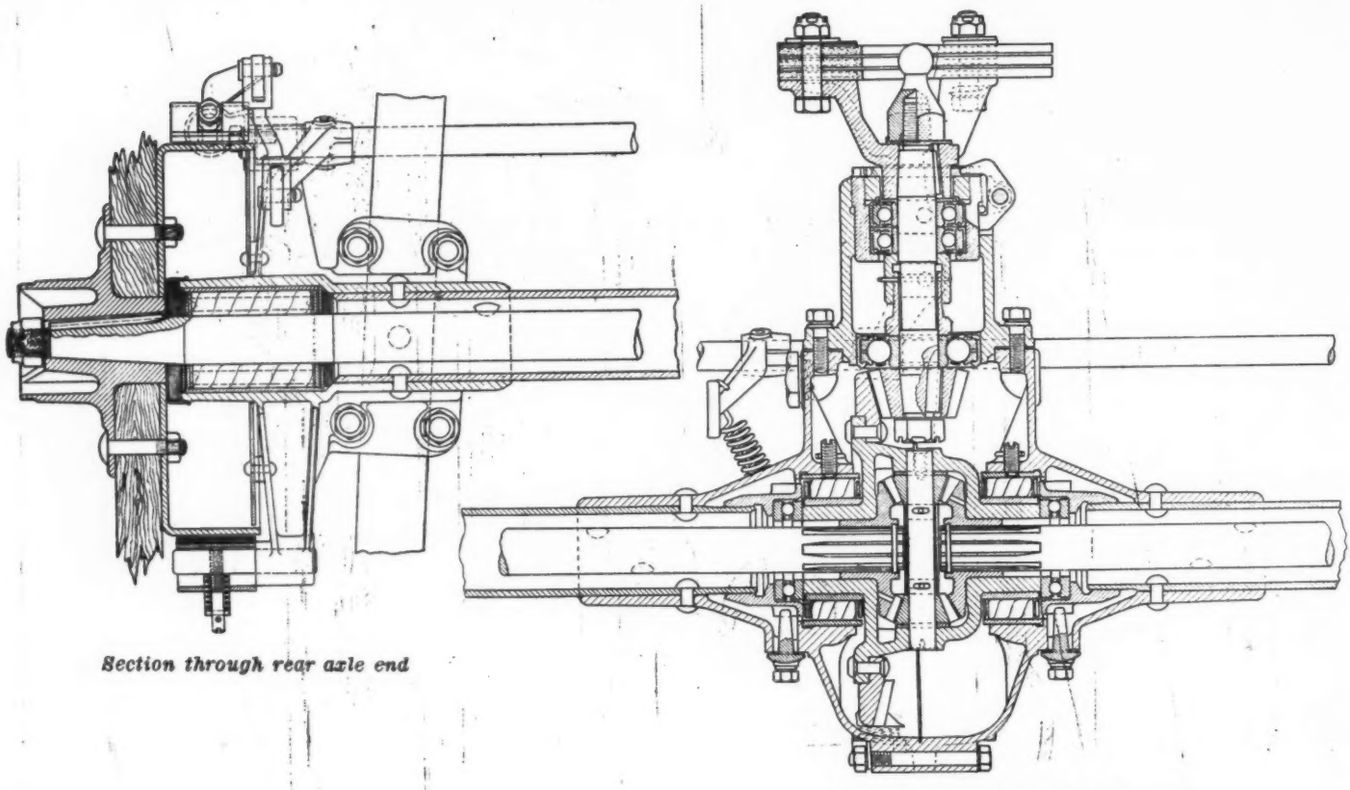
Plain view of the Briscoe 1920 chassis



Rear end of Briscoe 1920 chassis



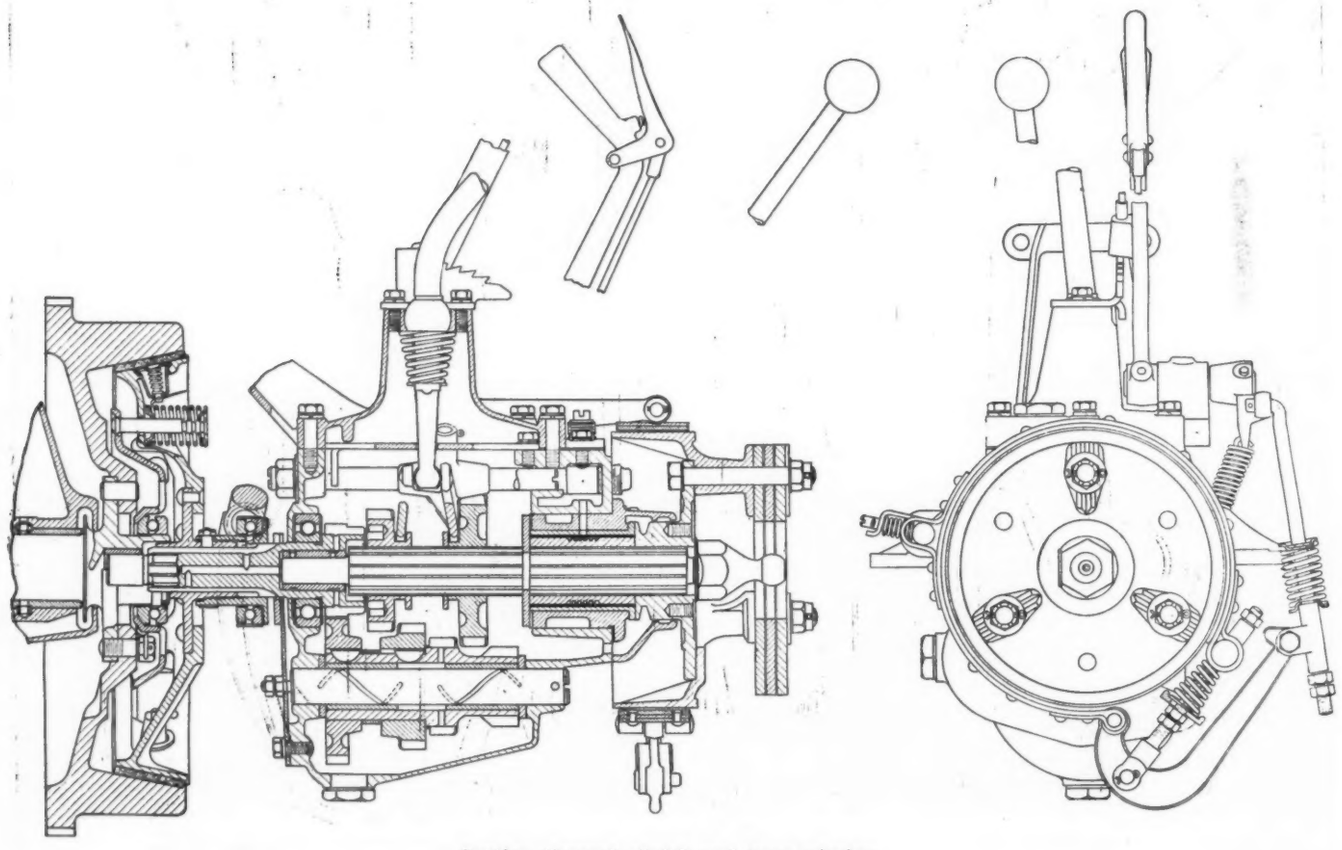
Briscoe 4-cylinder 3⅜x5 in. engine. Notable features are the integral cylinder block and top half of crank case, detachable cylinder heads, balanced crankshaft and pressed steel oil pan



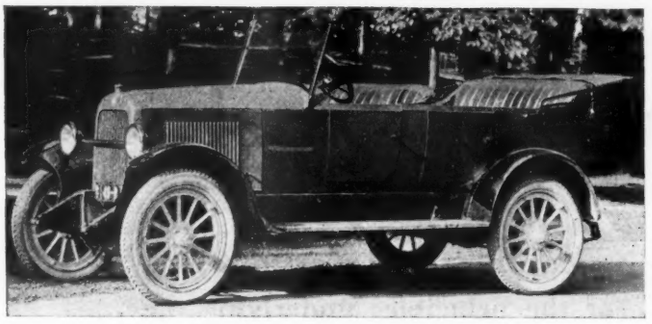
Section through rear axle end

Section through rear axle center

Details of Briscoe Design



Section through clutch and transmission



Side view, Briscoe touring car

What applies to the drill sizes also applies to the reamers, which have been cut down to an unusually small number, and practically all of these are standard sizes. The same limits are used wherever possible, the drawings generally specifying plus 0.0005 in. and minus 0.0015 in. tolerances. The use of similar size nuts for a great many uses throughout the car carries out this same principle, which will, of course, be keenly appreciated by dealers, owing to the effect on their service departments. An example of where lefts and rights are interchangeable is in the running board, and a particularly good example of the savings in die equipment for stamping is that all four doors of the touring car are alike.

The new Briscoe has a 5 in. longer wheelbase than the 1919 model, the present length of wheelbase being 109 in. The engine is now 3⅜x5 in., in place of 3 1/16x5⅛ in., and to take care of the increased size, the tires are now 31x4, non-skid all around, in place of 30x3½ in.

The Briscoe car is manufactured in large proportion by the Briscoe Motor Corp. of Jackson, which makes its own engines, transmission gearsets, steering gears and front and rear axles. A four-cylinder, block-cast, L-head type engine is employed, with removable cylinder head, three-bearing, counter-balanced crankshaft, and mounted semi-flexibly at four points. The engine follows conventional L-head practice, the valves all being mounted on the left side and the valve action covered by a removable cover plate, which can be quickly detached by turning an accessible lever nut. The cylinder head and the block, which carries the upper half of the crankcase integral, are iron castings, and the lower part of the crankcase is pressed steel. The pistons are also cast iron, 3⅝ in. in length, and carry three rings, two of which are above the piston boss and one just below the piston pin in a recess formed in the lower part of the boss.

The connecting rods are I-beam section, machined, 9 7/16 in. in length. The crankshaft is a counter-balanced type of heavy design, the diameter at the crank-pin being 1 1/8 in., and at the main bearing 1 1/8 in. at the front end and 1⅞ in. at the rear, the center bearing being an intermediate size between the two, allowing the tools in manufacture to go in from the front end of the engine. From front to rear the bearing lengths are, respectively, 2¼, 2⅛ and 3 in.

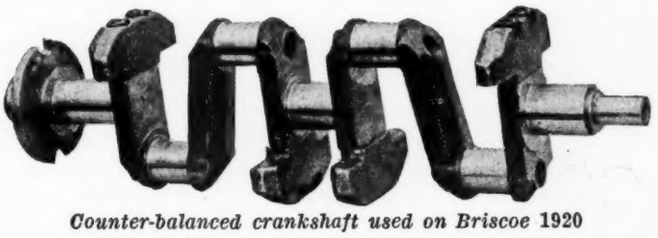
The valves are driven by spiral gears mounted on the front end of the engine and accessible by removing a simple cover plate. The camshaft is supported on three bearings and is 1 in. in diameter. The cams are forged integrally and bear on mushroom type followers. The tappets are hollow and the valve springs are single, concentric types, the valves being interchangeable, with 1⅝ in. clear opening and 5/16 in. lift.

Lubrication is by combined pressure feed and splash. The engine is mounted on a slight angle to provide a straight-line drive from the crankshaft to the rear axle when the car is under normal load. The oiling system is designed to take care of this, the oil being trapped in the sump below the splash tube on the connecting rod. There are direct pressure leads from the pump to the main bearing, the oil being carried in the lower part of the crankcase, which has a capacity of 1½ gal.

The clutch is a cone type with leather facing. It has an adjustable pedal and clutch brake. Coil springs are placed behind the leather for easy engagement, there being three of these auxiliary springs. The clutch face is 2 in. and the cone small diameter is 11⅝ in., and the large diameter 12 in. (measured to the outside of the leather). The gearset is a unit with the engine and is a selective type provided with three speeds forward and one reverse. The gears are wide faced and both gears and shaft are made of chrome steel, heat treated.

A unit powerplant is employed, but the bell housing is made of skeleton form, for the sake of lightness, and the wide, horizontal flange at the gearset is utilized for the two rear suspension points in the engine. The front two supporting points are integral with the block and upper part of crankcase casting, and are semi-flexible.

Hitchkiss drive is employed, two flexible fabric universal joints being used and alignment being secured by pilot points in the universal. The rear axle is semi-floating, of nickel steel, and is a spiral bevel type mounted on Hyatt roller bearings. The differential and pinion bearings are adjustable from the outside. The frame is pressed steel, the channel irons being 7 in. deep and braced with four cross-members secured by large gusset plates. The chassis is mounted on semi-elliptic springs front and rear, the spring



Counter-balanced crankshaft used on Briscoe 1920

lengths being 36 in. front and 54 in. rear. Steering is by worm and full wheel, with triple adjustment.

As regards appearance of the car, an unusual effect is obtained by giving the radiator a slight backward slant. A zig-zag type of radiator of large dimensions is employed, in view of the thermo-siphon method of circulation. A five passenger body with full bevel line is supplied, but the line also includes a sedan and a three-door coupe. The colors will be blue, with chassis and fenders black. The fenders are full oval crown type, with an extra wide running board. The cylindrical gasoline tank, mounted under the cowl, feeds by gravity and has a capacity of 12½ gal. The wheels are wood, artillery type. One set of brakes is carried on the rear wheels, while the hand brake acts on an 8 in. drum on the rear end of the transmission shaft. The front axle is a single drop forging of I section and is of the reverse Elliott type. It is carried on ball bearings.

Mechanical Design

(*Continued from page* 61)

loads, it was very annoying to the owner to have to tighten his belt every few weeks. The automatic or spring tensioning devices, which overcome this trouble, have seen some use, but today the tendency seems to be mainly towards positive adjusting devices which, when once set, "stay put." A good example of this is the clamped eccentric mounting of the fan bracket which is found on many cars. Another type is represented by the Reo illustrated by the sketch herewith.

Formerly the steering arm was usually fitted to the shaft of the worm wheel or sector by means of a square fitting. At the show a great many steering gears are seen with serrated shafts, that is, shafts having a multiplicity of small flutes. It also appears that steering gears of the screw and nut type are becoming more popular. These are not only somewhat more compact but they provide means of adjustment for wear, that is, if they are of the double screw type, which most of the newer designs are.

Case Hardening of Steel

In this article Doctor Rosenhain of the National Physical Laboratory, Teddington, England, presents an outline of the principles underlying the process and a discussion of some recent improvements in it which overcome the tendency for the case to crack and fleck off. We think we can congratulate the readers of Automotive Industries in that we are able at this time to present to them such an article by a world authority on metallurgical subjects. Engineers interested in this subject will recall the article on "Testing of Materials," by the same writer, in the issue of September 11

By Dr. Walter Rosenhain, D.Ss., F.R.S.*

CASE-hardened steel parts are probably employed to a greater extent in automobile construction than in any other industry. It may, therefore, be worth while to consider some of the difficulties connected with the case-hardening process, particularly as very considerable progress has been made in this matter in recent years.

The object of case-hardening is to provide a steel part with a hard outer coating which will afford a maximum resistance to wear, while retaining great toughness in the mass of the metal. This combination of tough and even a ductile core with an extrememly hard exterior is scarcely obtainable by any other means than the carburization of the outer layers of a mild steel, although there are other processes which tend in the same direction. Perhaps the most interesting of these is one in which a steel of somewhat high carbon-content is superficially hardened by being rapidly and intensely heated—a little piece at a time—by means of an electric arc applied under water. For special purposes, such treatment may have considerable advantages, and such cases may well occur in automobile construction, but the process provides no substitute for case-hardened parts.

Success in case-hardening depends upon a considerable number of factors, the most important of which are the choice of the right material for case-hardening and the careful and systematically-controlled application of the right treatment.

As regards choice of material, either a plain carbon steel or an alloy steel, such as one containing about 3 per cent of nickel, can be successfully used, although the two materials require somewhat different treatment. It is generally believed that successful case-hardening requires the use of a very mild steel, containing not much more than 0.10 per cent of carbon. For most purposes such a low-carbon steel is very desirable, but it is by no means essential, provided that the operations are adapted to the character of the steel actually used. What is most important, however, is that the steel should be pure and clean. The presence of non-metallic inclusions is one of the most fruitful sources of trouble in case-hardening, and regular successful output cannot be relied upon if steel is used in which large non-metallic enclosures occur. These tend to cause cracks during the quenching operations, and the higher cost of a purer steel is soon balanced by the reduction in the amount of scrap produced. The mere specification of a low sulphur and phosphorous content, however, is not sufficient to secure the desired cleanness. The best test is to be found in microscopic examination of the steel, while the occurrence of laminated or "woody" fractures also serves to indicate undesirable material.

The choice of the "cement," as the material in which the steel is to be embedded during the casing operation is often called, is not, as a rule, a matter of such very great importance. Endless proprietary articles are offered for this purpose and specious claims are advanced for each mixture. Recent investigation seems to show, however, that there is little advantage in any of these special "cements." If a mixture, having a very vigorous action, is desired, then some form of organic carbon, such as charred leather, mixed with some barium carbonate, will answer all purposes, provided that the same batch of mixture is not used so long that exhaustion of the carbon is approached. For some purposes, on the other hand, it is distinctly preferable to use less vigorous cementing material, and in that case by far the best cementing agent is carbon monoxide gas, produced by the interaction of carbon dioxide and carbon (charcoal) at high temperatures. Giollitti has worked out this method of cementation, particularly by the application of the gas under considerable pressure, and his results are remarkable. The very great advantage achieved by the gaseous process is that it makes it possible to produce very thick casings having a very gradual transition from the low-carbon core to the high-carbon case. It is also possible to regulate the entire operation very readily, so that extremely uniform results of high quality can be achieved. The special furnaces, however, are somewhat more complicated than the ordinary "pot" furnace in microscopic examination of the steel, while the occurrence in which case-hardening is more usually carried out. None the less, this special method of case hardening deserves careful attention.

The next condition for successful case-hardening relates to accurate and careful control of the carburizing operation itself and of the subsequent heat-treatment of the product. The fundamental condition is that the operation must be carried out in a furnace in which it is possible to obtain a uniform distribution of temperature combined with easy control of the rates of heating and cooling. Further, if regular and successful results are to be obtained, the operations must be conducted under the most careful control of temperatures by pyrometers. For this purpose it is not enough to buy even a good form of pyrometer and then to use it for a long time without further thought. Even the best of pyrometers requires not only careful and skillfull handling, but also frequent and ac-

*Of the National Physical Laboratory, Teddington, Eng.

curate calibration. A pyrometer that indicates wrongly is—if possible—worse than none at all. There is, too, a further consideration to be kept in mind. What is important for the conduct of a case-hardening operation is not the temperature of the furnace, but the temperature of the actual work—of the surfaces of steel in contact with the carburizing agents. It is often quite misleading, where articles are packed in heavy boxes surrounded by thick layers of "cement" to suppose that they will or do attain the temperature of the furnace; there is often a time-lag which is quite long enough to be very important for this purpose, nor can one rely entirely upon the constancy of such a time-lag from one heat to another. There is only one safe course—to place the pyrometer in the very center of the "pot" among the goods undergoing cementation, and to be guided by the temperature there indicated by the instrument.

TEMPERATURE AND TIME OF CARBURIZATION

The conduct of the actual operation must next be considered, the first question being the temperature and time of carburization. The time must depend upon the thickness of case desired, and it will also vary a little according to the cementing medium employed. The temperature to be used, however, depends more upon the character of the steel. The general principle to be followed is that it must exceed, but should not greatly exceed, the temperature of the highest critical point of the steel. The reason for this principle is very simple. Iron does not freely dissolve carbon—or, rather, carbide of iron, until it is itself in the so-called "γ" condition, and that condition is only completely attained at temperature above the highest critical point. This critical point, however, varies according to the carbon-content of the steel, falling rapidly from 900 deg. C in nearly pure iron down to about 700 deg. C for a carbon concentration of just under one per cent. Usually, carbon steels employed for case-hardening contain not much more than 0.1 per cent of carbon, and for these the upper critical point lies a little below 900 deg. C. The carburizing temperature, therefore, should be kept above 900 deg. C, but not much above it, although temperatures as high as 1000 deg. C are frequently used. These, however, entail even greater care in subsequent operations.

When the carburizing process is completed in the "pot" it remains to bring the steel down to the ordinary temperature and to harden the case by quenching. But before this can be done some attention must be given to the material of the core. Mild steel which has been heated for several hours to a temperature between 900 deg. C and 1000 deg. C acquires a very coarse, weak structure which is accompanied by considerable brittleness. Mere quenching either direct from the case-hardening furnace or subsequently from the point required for hardening the case, does not remedy this defect, and a special refining heat-treatment is needed. For this purpose, the steel must be re-heated so as to pass through the upper critical point (near 900 deg. C in the very mild steel we are considering) and this must be followed immediately by fairly rapid cooling, either in air, oil or water.

The reason for this treatment is very simple. On heating the steel through the critical range, a new structure corresponding to the re-formation of "γ" iron, is built up. When first formed, this structure is very fine-grained, but it becomes coarser if the steel is kept at the high temperature for any length of time. If, however, the steel is cooled quickly as soon as the fine new structure has been formed, a very marked and valuable refining is accomplished. When this has been done, we have a truly tough core whose character is unaffected by the final operation—that of hardening the case. This is done by re-heating the work to a temperature just above the carbon-change point of the steel, i. e., about 740 deg. C, followed by quenching in water or in oil, according to the size of the pieces and the degree of hardness desired in the case.

In the above account of the operation we have not dealt with one point which is, perhaps, the most important of all. This is the manner in which the steel is cooled down from the first case hardening process, i. e., at the end of the actual carburizing operation itself. There are two special reasons why this step of the process is important. The first is the risk that at this stage a sharp line of demarkation may be formed between the core and the case. The ideal state of affairs is, of course, that the hard case should merge very gradually into the tough core, and this is important because the final hardening operation produces very different effects on the soft, low-carbon material of the core and on the high-carbon case. One of the effects of this difference is that the hard outer layers undergo a greater change (increase) of volume than the core and if the transition from one to the other is unduly sudden, there is a considerable tendency for the case to flake off, thus producing one of the most typical defects of case-hardened products.

The reason why, at certain rates of cooling, there is a strong tendency for the formation of a sharp line of demarkation between core and case lies in the duplex micro-structure of steel. The harder regions consist, after passing through the lowest critical point, of fine alternating laminae of the two constituents, ferrite and cementite. The soft parts, on the other hand, consist only in isolated spots of this mixture of ferrite and cementite, while the bulk consists of free ferrite (pure iron). During the separation of these constituents, however, there is a strong tendency for like to group itself with like, and as a result of a suitable rate of cooling we find that from a certain region of the core near the edge of the case, the cementite of the case has attracted to itself all, or nearly all, the cementite from the core. The result is that instead of finding a gradual diminution of the cemetite, as we pass from case to core, it ends abruptly and abuts against a belt of nearly pure ferrite.

This undesirable state of affairs is best guarded against by very rapid cooling of the work immediately after the end of the carburizing operation. If the carburized articles can be tipped out of the boxes direct into the water—as is frequently done in the case-hardening of chain-rollers—then the kind of separation described above will be entirely prevented. This first quenching, however, cannot replace the subsequent re-heating and quick cooling for refining the core, since the essence of that operation is quick cooling immediately after heating up through the critical range.

While this initial quenching has very much to recommend it there are obviously many cases in which it is difficult to apply, particularly as it brings with it an additional risk of distortion. In that case the opposite mode of treatment can be adopted, viz., a very slow cooling from the temperature of carburization down to about 700 deg. C. It has been found that with such really slow cooling the diffusion inwards of carbide from the case towards the core is sufficient to overcome the "separatist" tendencies of ferrite and cementite. This slow cooling process applied at the end of the normal carburizing period, which has recently been worked out by Hanson and Hurst in England, is of particular value for another reason.

CEMENTITE NETWORK CAUSE OF CRACKING

If carburization is carried out of a high temperature and with a vigorous cementing agent, and the work is then cooled in the ordinary way by pulling the boxes out of the furnace, it is often found that the material of the case has assumed a particularly undesirable internal structure. To understand what happens we must realize that if steel takes up more than about 0.9 per cent of carbon and is subsequently cooled moderately slowly, or even quenched from just above the lowest critical point, a certain amount of "free cementite" will be present. Free cementite is, of course, a very hard constituent, and, if it is finely divided, may be useful, rather than harmful. Unfortunately, however, it is liable to assume a distribution, in the form of a more or less angular network, in which it is decidedly undesirable. In fact, the presence of such a cementite network has been definitely associated with a strong tendency towards cracking and flaking of the case, particularly during grinding operations.

When steel is carburized with a vigorous cementing agent at a temperature near 1000 deg. C, it is liable to take up, in its outer layers, a good deal more than 0.9 per cent of carbon, so that with ordinary cooling a cementite network is apt to be formed which subsequent heat-treatment will not remove. If, however, slow cooling is adopted at the end of the carburizing operation, it is found that during that stage—which may occupy four or six hours—the other layers of the steel take up little, if any, additional carbon, while the carbon already

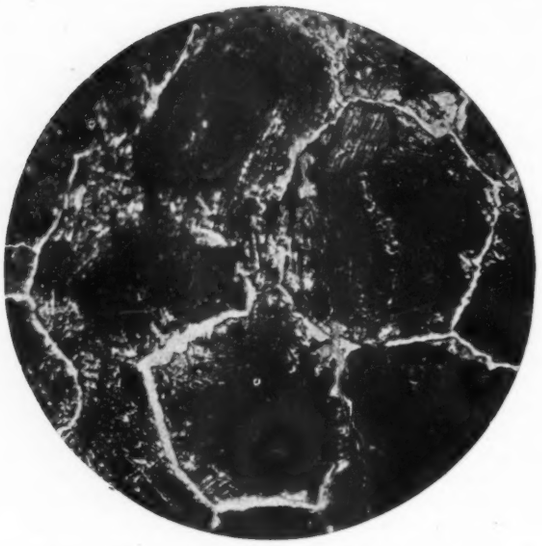


Fig. 1 — Photo-micrograph of the outer layer of the case of a case-hardened steel article in which the carbon content exceeds 0.9 per cent and which has been cooled at a moderate rate. The structure shows the indesirable network of hard and brittle cementite. (Magnification, 600 diameters)

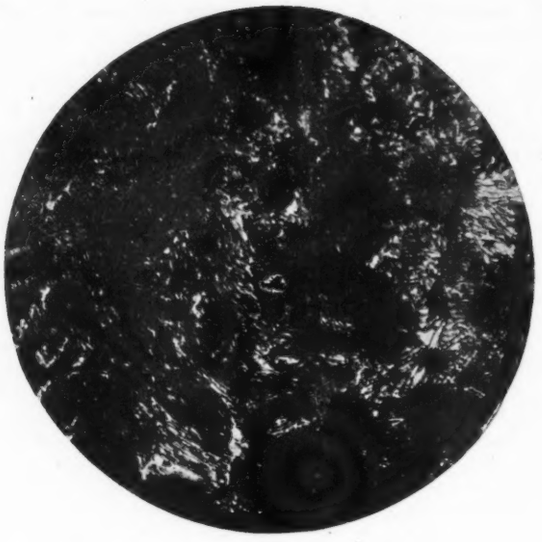


Fig. 2—Photo-micrograph of the outer layer of the case of a case-hardened steel article, carburized to the same extent as that illustrated in Fig. 1, but subsequently gradually cooled down to 700 deg. C. The objectionable cementite network has entirely disappeared. (Magnification, 600 diameters)

present in the case undergoes very appreciable diffusion inwards. If the time of carburization and the duration of this slow cooling at the end are properly adapted to the material used, and this can be achieved after a few trials, this result can be attained: At the end of the whole process the outer layers of the case have attained a carbon content close to 0.9 per cent (known as the "eutectoid" composition), and this carbon content falls off very gradually towards the low-carbon core, without the formation of any sharp line of division. When steel in this condition is re-heated for refining the core and later for hardening the case, no separation of any cementite network can occur, and a serious cause of subsequent loss is thereby eliminated.

What has just been said applies, strictly, only to plain carbon steels, but a little consideration will serve to show how it may be applied also to nickel steels which are so widely used for case-hardening in automobile work. In a 3 per cent nickel steel, the critical points are lowered and re-heating for refining purposes need not be carried much above 800 deg. C. This temperature is sufficiently low to serve as the hardening temperature for the carburized case as well as the refining temperature for the core, with the result that the two distinct operations required in the plain carbon steel can be combined into one for the nickel steel. On the other hand, nickel steel carburizes more slowly than plain carbon steel, so that a rather higher temperature is often used for that purpose, and, as this is proportionately much further above the upper critical point, the carbon-content of the outer layers of the case may rise to a considerable value above the "eutectoid" composition, with the corresponding risk of the formation of a cementite network unless immediate quenching or very slow cooling is made to follow the carburizing process. Provided the slow cooling process is carried well below the temperature to which re-heating for refining is afterwards to be carried, however, the formation of an undesirable network can be entirely prevented, and eminently satisfactory results are then obtained.

The account of the case-hardening process, which is here given, may, perhaps, strike some who are accustomed to regard it as an extremely simple and even "rough and ready" operation as unduly elaborate and complicated. When the steel itself is handled and examined, however, the whole process and the various stages and methods of regulation appear much less difficult. At all events, there can be no doubt that the careful regulation of this process on scientific lines is well worth while. Experience of British practice under war conditions has made this abundantly plain, and there must be many in America whose own experience tells the same tale.

Courses of Instruction in Kiln Drying and the Handling of Glues

IN response to numerous requests the United States Forest Products Laboratory at Madison, Wis., is offering two practical training courses—one in Kiln Drying and one in Handling of Glues and Plywood The scope of the work will be of particular value to superintendents, kiln foremen, and glue-room foremen, or men of similar qualifications.

These two courses are to be given at the laboratory simultaneously Jan. 12 to 23 and again April 12 to 23, unless it becomes necessary on account of coal shortage or other reasons to change the schedule. The courses may be repeated if found desirable.

Each course will be limited to ten men at a time, and not more than one representative of any company will be admitted unless vacancies occur. Priority of application will govern the selection of applicants to any course.

Inasmuch as this work is in addition to the regular work of the Forest Products Laboratory, a co-operative fee of $100 per man per course is charged to cover cost of conducting the courses. A payment of $10 must accompany the application, and the remainder is to be paid upon arrival at the laboratory. Further information can be obtained from the Director, Forest Products Laboratory, Madison, Wisconsin.

The FORUM

Proposed Horsepower Rating

Editor AUTOMOTIVE INDUSTRIES:

An article by Mr. Chestnutt in the October 9th issue of AUTOMOTIVE INDUSTRIES with the above title is exactly along the line that I have been thinking for several years. I think that every one will agree that a formula based on piston displacement is much more satisfactory than the N. A. C. C. formula.

I wish to give one more reason why 1000 r.p.m. is a good speed at which to base the rating. Nearly all engines (at least truck engines) will deliver their maximum torque at this speed, and any calculations based on the power at 1000 r.p.m. are safe when applied to the strength of power transmitting parts, tractive effort, etc.

The general form of an equation based on piston displacement is $D2LN \div C = HP$, in which C is a constant that should represent average results. In Mr. Chestnutt's proposed formula C equals 1273. An examination of the data contained in his Table 2 shows that in only 3 cases out of 24 does his formula give results larger than shown by the brake tests. Hence it would seem that 12.73 is too large a value for C. The total BHP at 1000 r.p.m. of the 24 engines is 748.5, the total by his formula is 699.1. It would seem that the value of C that would represent average results of all these brake tests should be $12.73 \times 699 \div 748 = 11.9$.

If we classify this data according to the stroke of the engine we find the average value of C to be 12.22 for the 4 engines of less than 5 inch stroke, 11.08 for the 4 engines of 5 inch stroke, 11.56 for the 4 engines between 5 and 6 inch stroke, and 12.05 for the 4 engines of 6 inch stroke. There is nothing in these figures to indicate that the stroke or bore-stroke ratio, has anything to do with the horse power per cu. in. of piston displacement.

The horse power curves published by our engine builder for seven sizes of engines show the average value of C at 1000 r.p.m. to be 11.97.

Some time ago I found a horse power table in a bulletin of the Sheldon Spring and Axle Co. based on the formula $H.P. = D2LN \div 12$ which they call the "Denby-Marshall" formula. I placed this table in my notebook and have been using it ever since. Yesterday I received a circular from another axle maker in which he specified the maximum horse-power allowed on his axles, based on the "Denby-Marshall" formula.

This formula seems to be about as accurate as any formula can be, and is very convenient to use. It becomes $D2L \div 3$ for 4 cylinder engines, $D2L \div 2$ for 6 cylinders, $D2L \div 1.5$ for 8 cylinders, and D2L for 12 cylinders. The corresponding formula for maximum torque is also quite simple. It is $0.4377\ D2LN = T$, which becomes $1.75\ D2L = T$ for 4 cylinder engines.

I cannot see any reason why this formula should not replace the N. A. C. C. formula.

Exports Handicapped by Confused Quotations

Editor AUTOMOTIVE INDUSTRIES:

The different interpretations given to the same shipping quotations in the United States and in Great Britain are causing minor upsets in Anglo-American trade relations that eventually will do America's foreign trade no good—and possibly much harm.

There are an unfortunate number of cases where trouble has arisen because the American interpretation of "F. O. B.," "F. A. S.," etc., differs from that established and accepted in the world trade of British merchants for half a century or more.

Numerous cases having come to its attention recently, the American Chamber of Commerce in London has arranged a series of informal conferences with such organizations as the Federation of British Industries; the Federation of British Iron, Steel, Tinplate and Metal Merchants; the American Express Company, representing ocean shipping on both sides of the water; U. S. Shipping Board in London.

The object of these conferences will be to determine the accepted definition of these shipping quotations on this side of the water as well as the varying interpretations put on them in the United States. If for any reason it appears impossible or impracticable to unify the interpretation of these terms on both sides of the water, the American Chamber of Commerce in London plans to draw up and circulate through all chambers of commerce, etc., the parallel definitions. In this way the buyer or seller in either country may always know in advance what a quotation from the other country means or how his own quotation will be interpreted there.

A prominent British merchant says: "The prompt action of the American Chamber is just what we have learned to expect in view of its many services to members and to Anglo-American trade in general during the period of import and other restrictions. The effort deserves recognition and support in both countries."

A report may be expected shortly and the American Chamber of Commerce in London hopes that this will obviate the present misunderstandings arising from such causes. Later it is hoped to do the same thing with other questions affecting Anglo-American trade.

AMERICAN CHAMBER OF COMMERCE

Aluminum Wheels for Trucks Reduce Unsprung Weight

The tests with these wheels produced by castings of light alloys have produced some interesting results. Especially is it interesting to note the results on tire wear. The tests on the wheels themselves for metal fatigue and for strength to resist side thrust and radial compression are illuminating

By J. Edward Schipper

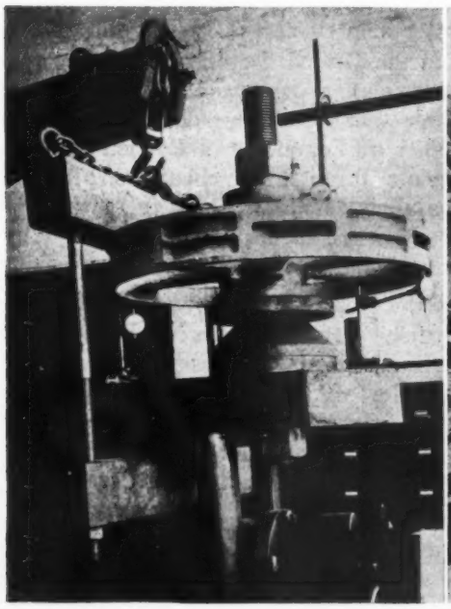
TRUCK wheels are the latest product to be fabricated from the light alloys. Lynite wheels, calculated to reduce unsprung weight and to be of material benefit in changing wheels or tires, are now on the market.

The wheels have been brought out after being subjected to extensive road and laboratory tests, which have shown up favorably. These tests have demonstrated the ability of the wheels to resist fatigue, and further tests have been conducted for the purpose of bringing out the strength of the wheels as regards side thrust and radial compression. The wheels weigh approximately one-half as much as those of other types, and it is claimed by the Aluminum Castings Co. that they have the advantage of affording easy tire changes, because the lock ring and tire cannot rust tight.

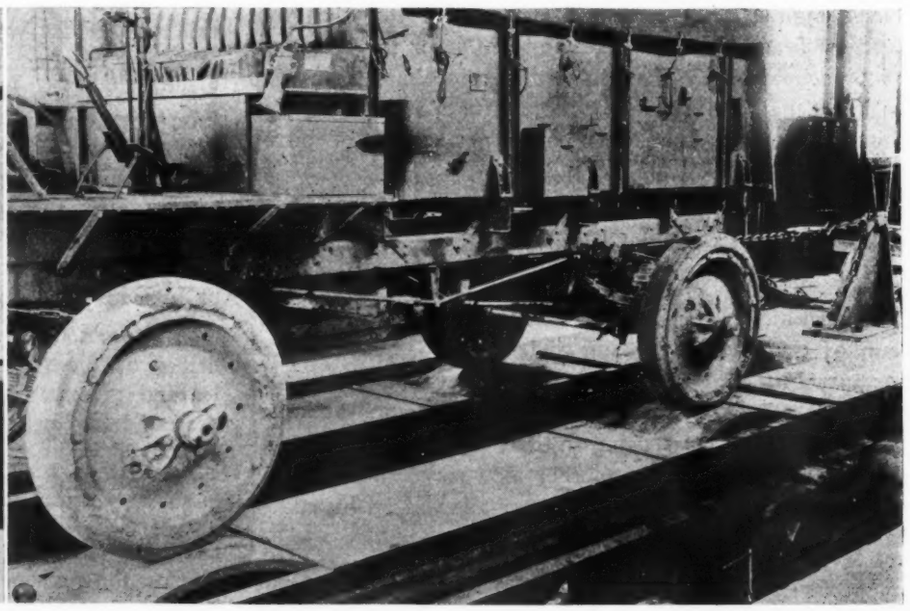
Among the road tests made on a large number of light and heavy trucks, with both solid and pneumatic tires, were both the usual run over city pavements and cross-country trips over the worst possible rural roads. These tests extended over a period of many months, and no failures of any kind were noted. Among the laboratory tests were those for metal fatigue, tire wear, resistance to side thrust and radial compression. The metal fatigue tests were conducted last summer.

During the first days of the run the engine of the truck failed to develop enough power, and a truck with a new engine was obtained. While the test was in progress three springs were broken and the six spring bolts which hold the leaves in alignment were sheared off. The front right spring also broke at the front eye, throwing the truck from the drums and breaking the stay rods and rear hook. These broken parts were replaced.

Upon completion of the test a careful examination of the Lynite wheels revealed no cracks, flaws or breaks of any kind. No signs of metal fatigue were visible. An examination for tire wear showed that the steel wheel tire was worn so that a smooth edge existed at each edge of the face, while a number of deep lateral cracks were perceptible across the entire width of the face. The Lynite wheel tire showed no such cracks, the tire core being intact all the way round. The temperature of the Lynite wheels after three



Tests are being made at Lynite Laboratories for side thrust



A 2-ton truck, equipped with three Lynite wheels and one steel wheel, was mounted on the dynamometer and run the equivalent of 500 miles, during which the wheels were subject to over 6,000,000 impacts

hours continuous running was 119 deg. and that of the steel wheel, 127 deg.

Tests for side thrust and radial compression are being conducted at the Lynite laboratories. The tests are for the obtaining of comparative data, with reference to Lynite wheels and other standard wheels. The metal for the new wheel is the new casting alloy recently announced and known as Lynite 145. This alloy has a tensile strength of 27,500 lb. per sq. in. and an elongation of 4.5 per cent in 2 in.

The Lynite wheel is a one-piece aluminum alloy casting made in either spoke or disc type. Aluminum wheels make for a material reduction in weight below the springs (unsprung weight). The importance of this reduction is generally appreciated and this requirement has long been carefully studied. While there is a wide divergence of opinion among engineers as to the relative importance of a saving in unsprung and sprung weight, respectively, it is generally admitted that a great deal is to be gained by saving unsprung weight, the chief advantages being economy in wear, increased carrying capacity, improved riding qualities, economy in fuel consumption and better acceleration.

It is obvious that when a motor vehicle is traveling at fair speed over an irregular road, there is a tendency for one or both wheels to break contact with the ground immediately after passing over some obstacle. As soon as a wheel leaves the road it begins to race, and when the wheel again comes in contact with the road a certain amount of slip must occur. This slip is very detrimental to the tire, causing severe road friction and tire grinding.

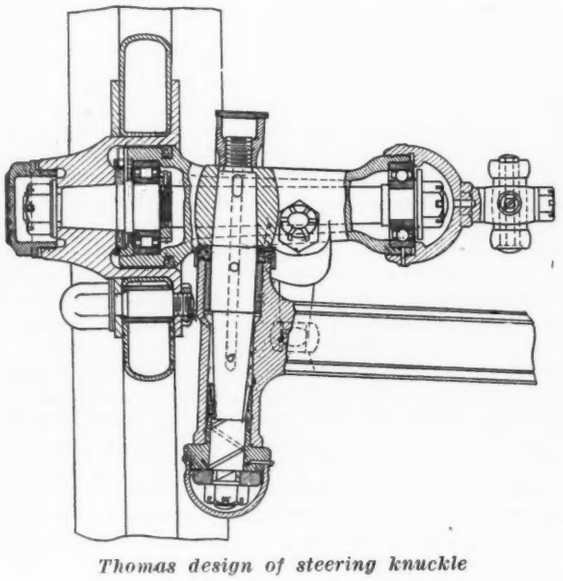
It was shown by test that when a truck traveling at 15 m. p. h. struck a two-inch bump, the wheel striking the blow left the road and, at greatly accelerated speed, traveled through the air for a total distance of 59 inches before again hitting the ground. Contact with the ground was followed by marked slippage and excessive tire wear.

When the wheels pass over a road obstruction an upward impulse is given to them and to all unsprung weight supported by them. The flexibility of the springs reduces the impulse imparted to the sprung weight. The energy stored in the springs will return light wheels to the ground more quickly than heavy ones. It is therefore evident that the upward impulse is greater with large unsprung weight, and light wheels will hold the ground better than heavy ones. In consequence, tire slippage and its resultant grinding wear are materially reduced by the lighter wheels.

Unusual Front Axle Design

A RATHER unique design of front axle is used on the Angus Sanderson car and is manufactured by E. G. Wrigley & Co., who make the principal components for the Angus Sanderson. A British patent has been issued to the inventor, W. Thomas.

A sleeve is provided with a wheel axle bearing at each end and a steering pivot stem is formed with, or secured to the sleeve between the bearings. The novel feature consists in means for connecting and operating the pair of bearing sleeves arranged with the two steering wheels. The sleeve is suitably enlarged at each end to accommodate ball bearings, one of the bearings being larger than the other. The bearings carry a wheel spindle which projects at one end and is adapted to receive the road wheel hub. The hub is cupped to fit freely over the adjacent end of the bearing sleeve. The opposite end of the sleeve is closed. On this end of one of the sleeves is formed a connection for the drag link of the steering mechanism. At a position between the bearings and rather nearer the outer or larger bearing is formed with the sleeve a pivot stem which fits a bearing on the axle bed of the chassis. On the sleeve is also provided an attachment for the usual tie rod by which the two wheels are connected.



Thomas design of steering knuckle

IN describing the oilfields of Athabaska in the Montreal Gazette, C. F. Law, of Vancouver, says that there are at least 30,000 barrels of oil per acre over an area of 40,000 acres. He also remarks that so far as this claim of oil wealth in the Great North West is concerned, modern diswealth in the Great Northwest is concerned, modern discoveries are only confirming the belief of a past century. An old map of that territory, dating back one hundred years, shows the route taken by Sir John Franklin's expedition to the Arctic regions. This was by way of Hudson Bay, and this map, prepared by Sir John Richardson, the scientist of the expedition, bore the words "petroleum and slag mineral patch" on the ground referred to.

The Komnick

(*Continued from Page* 69)

which is bolted to cross member back of fly wheel. The drive is by belt from a pulley, which is integral with the clutch housing. Belt adjustment is made through an eccentric on fan shaft.

WEIGHTS:

Connecting rod and piston complete, 6 lbs. 13 ounces.
Valve, 7 ounces.
Valve spring, 5 ounces.
Valve tappet assembly, 12 ounces.

REMARKS:

There is little out of the ordinary in the construction of this motor, except that all manifolds, crankcase and connections are of cast iron. The valve plugs have deep pockets and are of brass. The exhaust manifold has cast integral, a hot air stove. This motor would make a good service job if the front and rear crankshaft bearings were not carried in upper and lower cases. Balance of parts are very accessible. As a whole, the construction is very good with no surplus of parts or weights. This motor probably has been a production job, with average workmanship.

Three New Sources of Fuel Alcohol

Processes for the production of alcohol from molasses, wood waste and acetylene described in technical appendices to a German war-time law creating an alcohol monopoly—Commercial prospects of the processes discussed

GERMANY which, prior to the war manufactured alcohol only from potatoes and grains, when compelled by the Allied blockade to conserve its food supplies, resorted to different methods of alcohol production, some of which were formerly commercially impractical and others entirely unknown in that country. These include the following processes:

a—Process based on the use of molasses.
b—Process utilizing the sulphite liquor of plants for the purification of wood pulp.
c—Process consisting in saccharifying wood and fermenting the sugar thus produced (grain alcohol from wood).
d—Process of generating alcohol by the hydrogenation of acetic aldehye, which in turn is obtained by fixing the element of water on acetylene (carbide alcohol).

The German government assumed full charge of alcohol production, and it was feared in the industry that this step, which was taken as a war measure, would not be rescinded, but would result in an alcohol monopoly in the future.

This project of an alcohol monopoly was adopted on its third reading by the Reichstag, on July 13, 1918, by the Bundesrath on July 19, and finally promulgated as a law on the 26th of the same month.

In the text of this bill is found some very interesting information on the new processes (b, c and d) referred to in the foregoing. There is no need to refer here to the fiscal character of this law, but the technical appendices will be of interest to our readers, and a translation is here given. Aside from the technical information contained therein, these appendices furnish general indications regarding the economic values attributed to the different methods at the time.

In cellulose plants, the wood pulp is boiled in an aqueous solution of bisulphite of calcium, in order to purify the cellulose contained in the wood, by the elimination of materials with which it is impregnated. Up to quite recently, this bisulphite solution, after it had once served its purpose, was not recovered, but was drained off and often caused great damage.

During the early part of 1900, it was discovered that the waste liquors of German cellulose factories contained a little more than one per cent of sugar, and it was found that from 1,000 cu. ft. of this waste liquor it was possible to recover from 43.5 to 50 gal. of alcohol. These results were verified in 1915, by renewed experiments. The discovery, however, was never put to practical use in Germany, for the reason that the manufacture of alcohol from sulphite waste liquors—in view of the fiscal regulations concerning alcohol then in force—would have yielded no profit. Moreover, the often expressed belief that by the treatment of the sulphite waste liquors for the production of alcohol, (that is to say, by the elimination of the sugar content) the delicate question of waste liquor disposal would be solved, was not a sufficient incentive. In Sweden, on the other hand, the manufacture of alcohol from waste liquors was successfully taken up during the year 1909, and in that country there are now numerous plants for the production of alcohol from sulphites.

Under the compelling influences of the war the manufacture of alcohol from sulphite waste liquors was taken up anew in Germany, and the experience gained in Sweden was turned to good account.

The process for recovering alcohol from sulphite liquor comprises three operations, as follows: (1) The preparation of the waste liquor for fermentation; (2) the fermentation of the sulphitic must, and (3) the distillation of the fermented sulphitic solution.

Sulphite waste liquors contain, in addition to sulphurous acid, which interferes with the fermenting action of the yeast, acetic acid and formic acid. These acids are eliminated partly by blowing air through the waste liquors, after they have been raised to a temperature of 185-195 deg. F., partly by the addition of carbonate of lime and of a little slacked lime. The neutralization must be carried to a point necessitated by the subsequent fermentation. This is accomplished in concrete tanks in which the waste liquor is allowed to remain for some hours in order that it may become clarified. This is followed by another clarification of the liquor from which the mud has been separated, which is accomplished in a reservoir which serves for filling the fermentation vats. The waste liquor is then transferred to a concentration tank cooled by air, in which at the same time it is cooled, saturated with air and concentrated to a certain degree.

Fermentation takes place in tanks of 3,500 cu. ft. capacity, with the aid of a very active yeast, which has been slowly accustomed to the conditions which the fermentation of the waste liquor presents, and which is continually transferred from a tank in which fermentation has been completed, into a fresh tank. The sulphate waste liquor contains insufficient quantities of nutriment for the yeast, and for this reason there is added either ammonium sulphate, or super-phosphate, or, on the other hand, a yeast extract which is prepared in distilleries with waste liquor containing an excess of yeast. The fermentation takes place at 84-85 deg. F., and on the average requires 72 hrs., producing from 66-72 gal. of alcohol from 1,000 cu. ft. of waste liquor.

The alcohol contained in the fermented waste liquor is eliminated in large distilling apparatuses, in which, on account of the small alcohol must content, (0.9 to 0.95 per cent) and on account of the large quantity of liquid to be treated, the application of heat is especially advantageous. The must contains volatile, organic acids, and filters of sodium carbonate must be introduced during the distillation. The distilling apparatus may also receive a charge of a solution of sodium carbonate.

In some plants, the unrectified alcohol obtained from bisulphitic waste liquors still contains a small amount of sulphuric acid. The only thing to distinguish it from unrectified alcohol obtained from potatoes, is the small content of methyl alcohol and of aldehyde. Small quantities of fusel oil are also often found in it. The crude alcohol is materially improved by the use of distilling apparatus working on the principle of separating the head, in such a way as to obtain, by the separation of the heads (representing 10 per cent of the total) a sulphite alcohol susceptible of being denatured and the heads purified.

The purification of sulphite alcohol does not present any special difficulty. It should be pointed out, however, that rectified sulphite alcohol still contains a little wood alcohol which can be separated from it only with difficulty. Sulphite alcohol may be employed for all purposes for which potato alcohol is suitable.

If we assume a yield of 10.7 gal. of alcohol per ton of cellulose (which corresponds to 0.9 per cent of alcohol in the fermented liquor), the German sulphite distilleries with the plant installed by them during the war, in one year can furnish 116,000 hectoliters (3,000,000 gal.) of alcohol (corresponding to 1,044,000 metric quintals, or nearly 100,000 tons of potatoes). The total production of the cellulose works working the sulphite process being approximately 600,000 tons per year, in peace-time, by the treatment of all the waste liquors for the production of alcohol, it would be possible to obtain annually 6,400,000 gal. of alcohol (representing a consumption of 240,000 tons of potatoes). Whether the cellulose factories will extend their alcohol production will depend upon what progress is made with other methods of utilizing waste liquors. The small cellulose works, which during the war could work part of their waste liquors for the purpose of producing glues, did not consider it of sufficient importance to erect plants for the production of alcohol.

COST OF PRODUCTION

The cost of producing alcohol from sulphite is still undetermined. A diminution of the cost will not be possible until after the fruition of efforts looking towards the concentration of the vinasse derived from the emptying of the sulphite must, and toward the production of methyl alcohol, acetone, acetic acid, and cellulose wax by the dry distillation of this vinasse.

From the remotest antiquity, alcohol has been obtained from the saccharine juices of plants, and from vegetable material containing starch. Experiments with the object of preparing alcohol from cellulose—the carbo-hydrate of the greatest importance next to sugar and starch—were attempted only at a relatively late date. In 1819 it was found possible, by treating cellulose by means of concentrated sulphuric acid, to obtain a fermentable sugar, dextrose. The production of alcohol from the cellulose contained in wood seemed at first an insoluble problem, in spite of numerous researches. Not only does the need of large quantities of sulphuric acid for the transformation of the cellulose into sugar, occasion heavy expense, but it also involves great technical difficulties, which are due to the fact that it is necessary to separate the acid from the dilute saccharine solution.

Since 1890, chemists have paid renewed attention to the problem of obtaining alcohol from substances containing cellulose, as is evidenced by the numerous patents issued on the subject during that period. The latter generally relate to the transformation of cellulose, under the influence of a dilute mineral acid, and the majority effect the process in close vessels under pressure. Attempts have been made to saccharize the cellulose contained in peat, either by heating it for a long period in contact with an acid at atmospheric pressure, or by heating it for a short time in contact with an acid under high pressure. The saccharine solution obtained by filtration must be treated with chalk in order to diminish the acidity, and then be submitted to fermentation. For the saccharization of wood and of wood waste, numerous processes have been evolved, which utilize either sulphuric acid, sulphurous acid, anhydrous sulphite or a mixture of these, with the use of steam under pressure. In all of these processes, the sugar derived from the wood should be recovered by drainage. The aqueous saccharine solution should, after neutralization of the acid, be prepared for fermentation. Undoubtedly, this process permits of a yield of 14 to 28 gal. of alcohol per ton of wood in the dry state, starting with wood waste, which up to now was burned as of no value. Nevertheless, in Germany, alcohol derived from wood has not been able to compete with alcohol from potatoes, on account of the excise tax imposed. It is for this reason that none of the attempts (in Germany) to manufacture alcohol from wood have passed beyond the laboratory stage. On the contrary, in France, England and the United States the manufacture of alcohol from wood has entered the domain of practice. In one plant in the United States, which is said to have an annual output of 500,000 gal., the yield varies from 15.4 to 22.8 gal. of alcohol per ton of dry material.

BEGAN IN 1916

In Germany a beginning was made in the spring of 1916 in the manufacture of alcohol from wood, with the object of conserving the potato and molasses supply. The Classen process on the one hand, and the process of Windesheim—ten-Doornkaat, on the other, proved themselves best adapted for practical application. By the Classen process the sawdust is heated for 40 min. in rotary caldrons, with sulphurous acid, under a steam pressure of 7 atmospheres (313 deg. F.) The steam is then allowed to expand as rapidly as possible, and the saccharized wood must is emptied out into diffusers. The saccharine solution obtained by diffusion is neutralized up to the necessary point in tanks containing an agitator, an addition of table salt is made, and the mass is allowed to ferment in fermenting tanks with pressed yeast, or beer yeast. The alcohol formed is separated in the usual distilling apparatus. With the Classen process one may count on a yield of at least 14.5 gal. of alcohol per ton of dry material. The process has been improved, so that the yield already has been increased to 20 and 25 gal., and it undoubtedly will be still further increased.

By the Windesheim-ten-Doornkaat process, sawdust is heated with diluted hydrochloric acid in the presence of catalizers (metallic salts), in rotary caldrons, under a pressure of 7 to 8 atmospheres (330-340 deg. F.) for 20 to 30 min. The final treatment of the saccharized sawdust is the same as that already described. This process, which is probably subject to improvement, yields a minimum of 7.2 gal. of alcohol per 1,000 lb. of wood in the dry state.

The alcohol production plants under construction will work according to these two processes. The choice between the two will depend upon the kind of acid most available, and upon the alcohol yield which will be obtained. Germany produces from 500,000 to 1,000,000 tons of sawdust, susceptible of being treated for the manufacture of alcohol. The alcohol factories possess a total of 51 caldrons capable of handling one ton of dry material each. By working day and night, each caldron can handle 10 batches of material daily, or—figuring on 350 working days a year—3,500 batches yearly. That is to say, working to full capacity, it will be possible to treat 178,500 tons of wood annually, on the dry basis, or 238,000 tons of sawdust. If one figures on a yield of 14.4 gal. of alcohol per ton of dry material, a total production of 2,570,000 gal. of alcohol per year is arrived at, which is equivalent to the yield from 106,000 tons of potatoes. If the yield can be raised to 24 gal. of alcohol per ton of dry wood, as is to be expected, the production of alcohol will amount to 4,190,000 gal. (corresponding to 176,000 tons of potatoes).

It is still impossible to give any data regarding the cost of producing alcohol from wood. It is certain, however, that it is much higher than that of alcohol from sulphite. The production of alcohol from wood can become commercially practical only if the wood acted upon, when deprived of its sugar, can be utilized as feed, or rather if it should prove possible to obtain from it acetone, wood alcohol and other products of dry distillation. The necessary research work has not yet been carried out, and at present the only

use that can be made of the heat value of the residue of the saccharized wood, is to use it as fuel under the boilers in the alcohol plants.

The unrectified alcohol obtained from wood contains as impurities small quantities of aldehyde, wood alcohol, "furfurol" and fusel oil. The rectification of the alcohol, however, presents absolutely no difficulties. Inasmuch as the raw alcohol made from wood, on account of its low alcohol content, cannot be denatured, and therefore cannot be employed for industrial uses, purification readily yields an alcohol which is sufficient for the requirements of powder manufacture. It is still necessary to determine experimentally whether the recovery and commercial utilization of the by-products, such as furfurol, will not permit of reducing the cost of producing alcohol from wood.

MANUFACTURE OF ALCOHOL FROM CALCIUM CARBIDE

When lime and coke are heated to the temperature of the electric furnace, about 5,000 deg. F., a new chemical compound is obtained—calcium carbide. Of all the numerous carbides known, the carbide of calcium is industrially of by far the greatest importance, and for this reason it is generally called simply carbide. It is decomposed by water, forming acetylene, with a residue of lime. If acetylene is introduced into a heated, diluted acid, in the presence of a mercury compound, aldehyde (acetaldehyde) is formed, the components of water beng fixed upon the carbide. Aldehyde is a very volatile combustible liquid, of penetrating odor, which combines with hydrogen in the presence of certain metallic catalizers, such as nickel, producing ethyl alcohol (grain alcohol).

As the acid used and the mercury compounds or other metallic catalizers are not modified in the process, or in any case are capable of being returned to their initial state with only small loss, and as the hydrogen may be produced with coke and water, this method of manufacturing alcohol requires only coal, limestone and a rather small amount of heat.

In the manufacture of alcohol from carbide, the following expenses are incurred: 1—Manufacture of carbide; for 1,000 gal. of alcohol it is well, in the present state of the art, to count on approximately 6.5 tons of carbide, for the production of which 24,000 kilowat hrs. ,8 tons of coal and 12 tons of limestone are necessary. If cheap power is obtainable in the neighborhood, as, for instance, water power, or power obtained from cheap fuels, such as lignite and peat, the cost per kilowatt-hour may be as low as 2 pfennings; in that case, the power cost for 1,000 gal. of carbide may be set down at 240 marks. The cost of the raw material, charcoal and limestone, is approximately 60 marks; the cost price of carbide previous to the war in Germany was 112 to 115 marks per ton. Experience indicates that these figures represent the lower limit, and this statement is corroborated by the figures previously given. As far as can be judged at present, small plants, or those not favorably situated, could not produce at this figure. What the price of carbide may be after the war can only be conjectured. It should be pointed out, however, that the cost of packing for the retail trade, which must be of such a character as to prevent all moisture from reaching the carbide, which cost is not inappreciable, need not be considered here, and that the overhead expenses connected with the manufacture of carbide at wholesale need not play a very important part. Moreover, the amount of 2 pfennings per K. W. hr. does not seem to be the minimum at which power can be delivered in Germany.

2—The manufacture of acetylene from carbide does not involve any special expenses for other raw materials, for the decomposition of carbide is effected by means of water, and the purification of the gas is effected by different purifying masses of which some are cheap in themselves, while others are capable of being regenerated, among these latter figuring compounds of copper, chrome and lead, as well as of chlorine and lime. The yield to be expected is 80 gal., equivalent to 0.35 lb. of acetylene per pound of carbide of good quality.

3—The following operation, that is to say, the transformation of acetylene into aldehyde, does not involve the consumption of any important amount of raw material, but does involve the consumption of a large amount of energy. Up to the present, it involves only slight losses. The yield, according to information furnished by the plants, (of which none has been in operation for any great length of time) is at most 90 per cent.

4—A most important item in the final operation, the production of alcohol, is the consumption of hydrogen. In order to obtain 1,000 gal. of alcohol, it has been calculated that it is necessary to consume at least 53,000 cu. ft. of hydrogen, which can be obtained at about 2.25 marks per 1,000 cu. ft., this low price being made possible by the low cost of the raw materials, in spite of the expensive installations necessitated for production and purification.

Assuming that all conditions are favorable, that is to say, that the location of the plant is wisely chosen, and that operations are conducted on a sufficiently large scale, one may count on a cost price of 900 marks per 1,000 gal. of alcohol, equivalent to 90 pfennings per gal., this including the cost of raw materials. To this must be added something for depreciation of plant, salaries, etc., items which are rather difficult to estimate in advance. The purification of the alcohol obtained should not present any greater difficulties than the purification of alcohol obtained by fermentation. As a result of the method of preparation, it does not contain any secondary product of fermentation known under the name of fusel oil; on the other hand, it may contain some sulphuric, phosphoric and arsenic combinations and certainly there will be aldehyde and substances derived therefrom. The best samples so far presented to the government represent a fine industrial alcohol which can be used in most industries.

PRICE CALCULATION

The preceding price calculations are confined to a certain extent by the conditions of a contract under which a Lonza (Switzerland) concern has engaged to furnish alcohol obtained from carbide to the Swiss government. The price of the rectified alcohol, according to the contract, is to be 1,330 marks per 1,000 gal., the Federal administration taking delivery at the plant in its own tank cars. From a certain point of view, the operating conditions of the plant at Lonza should be better than could generally be obtained in Germany. Undoubtedly this plant gets its power at less than 2 pfennings per K. W. hr. Near the great waterfalls in Norway, there are large plants which obtain power at approximately 0.5 pfenning per K. W. hr. On the other hand, the contract was closed on the basis of high cost of coal (36 marks per ton). The cost price of the Lonza plant (which is a private enterprise), may be estimated at a little more than 110 marks per 100 gal. of alcohol.

It should not be lost sight of that such calculations are subject to numerous causes of error, which are difficult to estimate. If, for instance, the cost of the K. W. hr. becomes greater than that previously given, as may easily happen in certain parts of Germany, if the yield of aldehyde or alcohol is a few per cent less than that assumed, or if the renewal of the carbide furnaces occasions greater expense than that provided for, and finally, if the royalty to be paid on the patents is added, the cost price of alcohol from carbide may come somewhat higher than that arrived at above. A private corporation, which has carried on experiments on a small scale, has reached the conclusion that alcohol derived from carbide cannot easily compete with alcohol of fermentation, even if taxation should be the same.

The process outlined above is so far the only one which has been applied on a large scale. However, it is not the only one theoretically possible. One may also conceive of a process in which no aldehyde is produced, but only ethylene, by the addition of hydrogen to the acetylene. It is an easy matter to pass from ethylene to ethyl alcohol, by a process which has been known for a long time. This has recently been more closely investigated, but it is not yet possible to give any information regarding its success.

Plants already in existence in Germany for the manufacture of carbide and those whose construction has been decided upon, will furnish annually from 400,000 to 450,000 tons of carbide, when operating to full capacity. After deducting the quantities of carbide necessary for lighting, for

metallurgical operations, etc., there remain nearly 400,000 tons for fertilizer or for alcohol, and this would produce 66,000,000 gal. of alcohol.

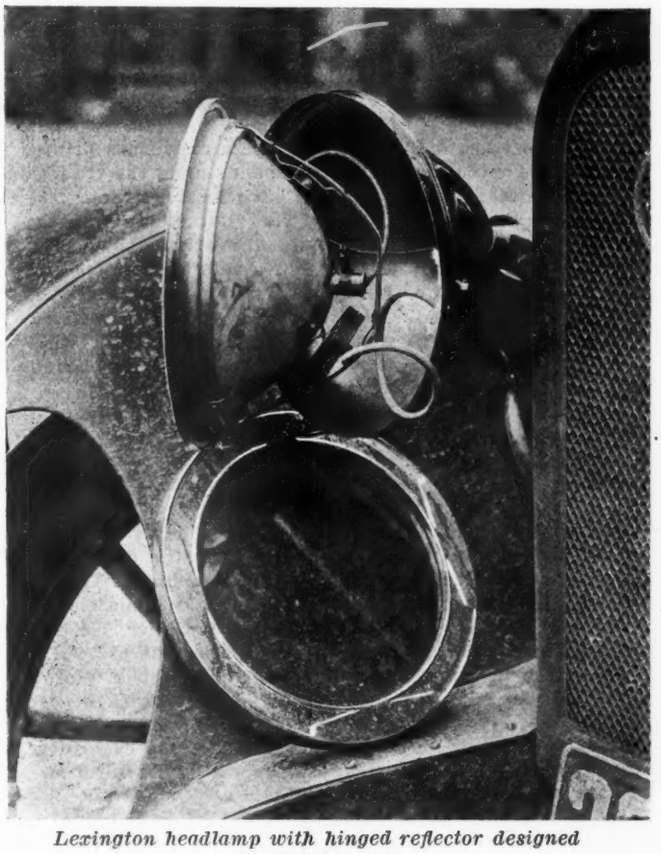
It remains to be investigated what influence the calcium cyanamide obtained from carbide may have on the production of potatoes, and thus on the production of alcohol.

One pound of carbide when heated with nitrogen furnishes 1.25 pounds of calcium cyanamide, containing approximately 20 per cent of nitrogen, and considering that it is customary to count on a gain in yield of 100 pounds of potatoes per pound of fixed nitrogen in the fertilizer, the use of one pound of carbide for the manufacture of nitrogenous fertilizers would result in a gain in production up to 25 pounds of potatoes, equivalent to 0.333 gal. of alcohol; that is to say, more than four times the amount of alcohol which may be obtained directly by chemical process.

On the other hand, if one considers that calcium cyanamide is now the lowest priced fertilizer, and that the growing of potatoes usually has a very favorable effect upon the following other crops, the direct manufacture of alcohol from carbide cannot be considered seriously until the agricultural demands for nitrogenous fertilizers in Germany have been satisfied in some other way, and filled at an adequate price. On the other hand, it is possible that there will not be a demand for a long time for all of the fertilizer that can be produced by the German plants utilizing carbide. Calcium cyanamide has this disadvantage that the caustic dust is very annoying when it is being spread, and that its fertilizing action depends, more than for other nitrogenous fertilizers, upon the nature of the soil, the atmospheric conditions, the nature of the plant, and the method and time of use. The German demand for nitrogenous fertilizers in the next few years may be estimated at between 1,500,000 and 2,000,000 tons per year. The yield in ammonium sulphate of the German coke ovens may be estimated at approximately 500,000 tons, and this may be increased. In fact, it is likely that the production of ammonium sulphate at the coke works will be increased to 1,000,000 tons within a few years. Whether it will be possible to readily sell from 500,000 to 600,000 tons of fertilizer, in the form of calcium cyanamide, will depend in the first place upon the price, and also upon the competition created by the importation of saltpeter from Chili, and from Norway, and other fertilizers which are technically perhaps even more advantageous. Under the first head, we have to do here with ammonium compounds, and with their derivates prepared by the Haber process, the entire supply of which at the present is under government control. If the nitrogenous fertilizers, which are relatively cheaper than those obtained from carbide, should be set free again, the result would be that the large German factories of carbide and calcium cyanamide would have to look elsewhere for a market for their products.

Pivoted Reflector to Solve Glare Problem

GLARE, as someone has said, is illumination in the wrong place. Even the most intense light on the road directly in front of a car is not productive of glare, but a beam of more than moderate intensity thrown directly into the eyes of an oncoming driver or a pedestrian is objectionable. Glare being a matter of misdirected illumination, it can evidently be cured by furnishing the driver with means for controlling the direction of the headlight beams. This is done in special headlamps with pivoted reflectors furnished with the Lexington car.



Lexington headlamp with hinged reflector designed to obviate glare

The photograph herewith shows the construction of the Lexington lamp. The reflector is pivoted in the shell and is normally held in the "down" position by a spring, in which position it illuminates only the road immediately ahead of the car. By means of a bellows between the reflector and the shell, which is connected to the engine inlet manifold, the reflector can be turned up and caused to throw a strong beam of light several hundred feet ahead of the car.

The reflector pivot support, cable connection to the lamp base, tube connection to the bellows and the spring holding the reflector in its normal position are clearly shown in the illustration. To raise the beam of light the driver merely touches a control lever on the dash or instrument board.

Petroleum Topping Plants in California

THE Bureau of Mines, Department of the Interior, announces the publication of Bulletin 162, "Removal of the Lighter Hydrocarbons from Petroleum by Continuous Distillation as Practiced in California," by J. M. Wadsworth, Petroleum Engineer.

This bulletin describes the construction and operation of the type of continuous distillation plants commonly known as "topping" or "skimming" plants. Detailed descriptions are given on methods of constructing and operating a number of representative plants.

The topping industry is very important in California since the nature and uses of the oil render it necessary to utilize a cheap and rapid method for dehydrating and increasing the flash point of the oil to the extent that it can be utilized as fuel for the railroads and industrial plants. Topping plants are also made use of to a certain extent in conjunction with a complete refinery as they furnish a cheap and rapid means for removing the lighter fractions from the crude.

The plants studied handled about 2,300,000 barrels of crude monthly and produced approximately 400,000 barrels of tops, an average yield of 18%. The cost of the plants per barrel daily capacity varied from $2.00 to $28.55, total fuel consumed under the stills and boilers 1.07 to 3.69 per cent of crude treated, and the combined efficiency of furnace stills ranged from 34.8 to 66 per cent.

American Advertising Possibilities in South America

Chile offers better advertising possibilities for the American automobile manufacturer than either Peru or Bolivia. The peculiarities of these countries and the advertising methods best suited to each of them are discussed in a report of Trade Commissioner J. W. Sanger

By Allen Sinsheimer

ADVERTISING in Chile, Peru and Bolivia by American manufacturers or through their agents can be accomplished with some degree of success, but only after thorough analysis of the fields and all of the surrounding factors, according to J. W. Sanger, Trade Commissioner, who has issued a report, through the Department of Commerce, on advertising in these three countries.

Chile offers the best advertising field of the three countries. It is a country averaging less than 100 miles wide and 2,800 miles long, and because of this shape has every climate known to man. It is divided into three zones, the nitrate zone at the north, the central district including Valparaiso and Concepcion, and southern Chile, which is the forest and grain producing sections. The central section is the important consuming and importing district. The people are predominately of European extraction, and persons of white blood are estimated to comprise 50 per cent of the population. The huge middle class predominates as in contrast to Peru and Bolivia where there are but two classes. Chile's population totals 3,500,000, of which 50 per cent includes the wealthy and middle classes, who are chiefly interested in foreign trade because they buy the vast bulk of imported articles.

Chile is primarily an agricultural and mining country. The war diverted its imports from Europe to the United States, and whether or not this country will hold them remains to be seen. That the entire importing and retail interests are in the hands of Europeans and that the United States had neither banking nor adequate shipping facilities until recently, and yet held 17 per cent of the pre-war imports as against 30 per cent from England and 25 per cent from Germany, indicates a creditable American showing, and a hopeful future prospect.

The Chilean business man who heretofore gave over his interests largely to large estates or to the professions is taking a more active part in business. As a result, the small group of strong European importing houses is gradually breaking up and has not so strong a hold on the importing business as formerly. These European concerns used advertising only in a perfunctory way, depending more on personal acquaintance for business.

Today the smaller merchants are buying more directly from the factories and are beginning to realize the value of advertising. This is particularly true among the importers of automobiles, who up to a few years ago were skeptical at the wisdom of American automobile advertising.

They have learned that the appropriations made by American factories for automobile advertising increase production, means cheaper raw materials and lower-priced cars, and instead of now regarding these appropriations as a waste they insist that they get their share of them to promote sales in their districts.

The Chilean importer has heretofore shouldered his own advertising bills without help from the makers, excepting in a few cases where the manufacturers have made allotments on a basis of percentage of sales, leaving the importer free to use it as he saw fit, the only requirements being that the goods shall be advertised under the proper name or trade-mark.

The importance of American business magazines printed in Spanish and circulated in Chile depends upon the trade journal itself. Many manufacturers have received their first orders through the better ones. The character of the export journal depends upon its total circulation, how the circulation was secured, the type of readers, the certification of the circulation by the Audit Bureau of Circulations, by the character of the editorial staff and by the method in which the papers are sent out through the mails, that is, whether they are sent out wrapped, stamped and individually addressed or in bulk.

The use of catalogs, folders and letters properly compiled, brings good results. American manufacturers have but five methods of approaching the Chilean public: Branch houses, traveling salesmen, local agencies, commission houses, or direct by mail. In the event of the latter being the only medium used it is important that every letter and catalog should be properly compiled, because it is the only evidence or picture of the concern to the prospective buyer. Courteous personal letters should accompany all catalogs and should be written in Spanish with all the idioms of Chile. No duty is assessed on single catalogs entering Chile, but printed matter accepted in small quantities pays an import duty of 16½ cents per pound. It is exceedingly important that postage should be fully prepaid as the addressee is assessable at double the amount of any shortage. The use of leaflets or small booklets as inclosures with goods should form an important advertising feature in Chile.

There are 400 publications in Chile of which not more than fifteen have an advertising interest to the American producers. The leading daily paper of Santiago, the El Mercurio, which is also the most influential paper in Valparaiso and Antofagasta, devotes its entire front page to two-color advertisements. The second most influential paper in Santiago is

the LaNacion. El Sur dominates the field in Concepcion. Weeklies and monthlies published in Chile with the exception of Zigzag of Santiago and Sucesos of Valparaiso in Santiago are not highly regarded by advertisers.

The American copy must not only be translated into correct Spanish, but must be written with the idioms of the country in mind. It must not be of the free, easy and intimate type used in this country, but instead, while it may have snap and sparkle, must be written in Spanish with the dignity, indirection and formality of that language. Each Spanish speaking country in South America has its own idioms and phrases and these must be observed. Likewise American dealers must not refer to their commodities as American because Chileans class us as North Americans, the Yankees or the "States" and consider themselves also as Americans. Perhaps the best copy-writer for Chilean advertising would be a highly educated Latin-American. These men are scarce and the next best plan is to employ a translator familiar with the country and its language.

Advertising copy can either be prepared in the United States by the factory's advertising department or by the local agent or dealer in Chile. Advertising prepared in the United States must bear Latin-America in mind at all times. The illustrations must consider the local conditions and any attempt to copy the illustrations or copy used in this country would be wasteful. The best plan is to have the advertiser work six months in advance and submit rough proofs to his dealer for consideration and criticism.

Chilean newspapers are not averse to free publicity. The warning legend "ADV" is not required by law in connection with news-ads. The Chilean advertisers welcome engravings or matrices from the manufacturers, and particularly welcome engravings of specific articles without "palm trees or United States views," so that he can supply his own copy. The importers also prefer to place the advertising themselves because they can secure lower rates than the firms in the United States. Advertising bills can be paid in Chile through the Valparaiso and Santiago branhes of the City Bank of New York, or direct by buying Chilean exchange and sending it with the order.

Motion pictures, although not as enthusiastically received in Chile as in the United States, are well attended and certain makes of automobiles have found good sale through advertisements on the screens. Street car advertising has not been used to any extent excepting in Valparaiso and Santiago, and in the Valparaiso cars the concession is held exclusively by a tobacco company for its own products. Santiago is just awakening to the possibilities of street car advertising, and a five year concession has been granted to a company which will resell space to individual advertisers. Cards are not uniform in size or material, are brilliantly colored and range from 12x24 in. to 6 in. square. Film "transparencies" are used on the glass windows of the cars. Painted boards erected outside of the cars and running the full length are also used. There is no poster or painted board advertising except in Santiago. There are no electric displays used in Chile for advertising purposes. The windows of the leading Santiago stores have improved considerably in the past few years and would be a credit to a city of similar size in the United States. Calendar advertising is not known or successfully used in Chile.

Warning is given by Mr. Sanger in his pamphlet as to the absolute necessity of registering trade-marks in Chile, where the only method of protecting marking is by registration. Trade-marks should be simple and strong, and if colors are used they should be bold. Care should be taken if an American trade name is used that its translation does not have a questionable or opposite meaning in Spanish. Warning is also given that trade-marks should not be registered in the name of the Chilean agents, but should be in the name of the owner of the trade-mark.

Peru, lying south of the equator, with a population of 3,500,000, comprises only poor and rich classes. Spanish is the national tongue, but the Indian languages are also liberally used. The country manufactures nothing, but produces and ships large quantities of sugar, cotton, copper, petroleum and hides. It is notorious for its poverty, with an import buying power of $7.00 per capita for an average of three years preceding the war, and its widespread illiteracy and its age-old customs. It is particularly a market for commodities used for farming and mining. Twenty-five per cent of Peru's $28,000,000 yearly imports came from the United States for the three normal years before the war, 28 per cent from England and 18 per cent from Germany. There is no middle class in Peru; the illiteracy is over 80 per cent, which indicates the difficulties advertisers will encounter. Only 10 per cent of the population is white, and many of the remainder are poor Indians who do not even speak Spanish. Sales letters, folders and direct by mail advertising are little used. Newspapers are of little consequence. There are no trade journals, farm papers, women's publications or magazines of general news or circulation published throughout the country. The Peruvian newspapers reflect the quiet, unaggressive merchandise methods used in the country, yet they are undoubtedly the best medium of advertising even with their limitations. Any advertisements published should first have consideration of the customs of the country and its idioms. Illustrations are little used except for automobile advertising, for which the engravings or matrices come directly from the factory for the advertising agent.

Motion pictures, although little used as yet for advertising, are recommended by Mr. Sanger as a medium for reaching many classes of people. The Peruvian appears to like the same things that Americans like, and a motion picture of American automobile manufacture interwoven with fiction would make good, profitable advertising. There is no development of street car advertising except in Lima, and even in that city it is seldom used. Distributing hand bills has never been undertaken in the country. The window displays are in keeping with the backward merchandising methods. However, the use of a trade-mark in advertising in Peru has some value, but trade-marks must be protected by legal registration in Peru as in Chile.

In summarizing, Mr. Sanger finds a low per cent of literacy, general poverty and correspondingly low consumption of imports per capita, a lack of influential media, a lack of ability to co-operate on the part of the leading publications and a shortage of local channels, such as advertising agents, etc., making Peru an unpromising field for the advertiser. He suggests the following methods of entering the Peruvian business field, naming them in the order of their importance:

By resident American agents, or better still, by branch houses wherever the expense is warranted.
By traveling salesmen.
By using local houses as agencies.
By correspondence.
Through export commission houses. This last method, while it may possibly produce more immediate sales, is the least satisfactory for the manufacturer who desires to insure an increasing market for his own goods.

Peru, states Mr. Sanger, is potentially one of the richest countries in South America, and advertising in it is for the future and not the present.

Bolivia, which, except Argentina and Brazil, is the largest South American country, is without a seacoast. It is ten times as large as the state of Illinois, and has a population slightly less than that of Chicago. Not over 10 per cent of this scant population is white, 25 per cent are mixed white and Indian blood and 50 per cent are pure Indians, who do not speak Spanish. Although Bolivia is rapidly increasing its railroad mileage, it is an isolated country, a great part inaccessible and unexplored. In Bolivia one is faced with even more problems than in Peru, and finds the same low purchasing power, low per capita imports, and other obstacles to successful advertising. Even the best of the newspapers have small circulation, one of the leading papers having but 6,000 readers in the city of Lapaz.

The pamphlet by Mr. Sanger also includes a list of the better publications in Chile, Peru and Bolivia, and can be secured by application to the Bureau of Foreign and Domestic Commerce.

Breaking Bad Habits in Publicity

Here is an intimate chat on automobile publicity by a man who has seen it from both sides; he has received it as an editor and written it as a publicity man. His frankly written conclusions cast a new light on this vital problem

By Monte W. Sohn*

WHEN a man builds himself a bad habit—a habit, which, when he is shaving in the morning, he is willing to admit to his lathered likeness—there are two ways by which you get him to reform said habit. One way to attract his especial attention to the need for leading the wicked little habit back to the tow path of righteousness is to throw bricks at it. Whereupon he will punch you on the nose.

But mine is a stanch nose.

I once was an automobile editor. As in many cases today, the job that went with the title was mulatto, sort of; that is, it was neither editorial nor advertising, but a combination. I gathered the automobile advertising and, with the aid of shears, automobile publicity from the factories and my own imagination produced the material for a once weekly automobile section. In the main, the result was only fair. On the other hand, had I used only the stuff that came to me from publicity sources, my automobile section would have been read only, I think, by the local trade.

The trouble with automobile publicity is that it has no soul. It doesn't give a damn how many people read it. It is pale, with weak readability, because those who send it forth are not concerned with whether it will be read. Their chief hope for its future is that a great number of newspapers will print it. The automobile editor, who knows how putrid most of it is, edits the junk and uses much of it, because, early in his advent to the position he has had it made very plain by factories and local dealers that in their opinion the drab drivel in question is par, sterling and top hole. Besides, "Any use of this material will be highly appreciated."

Four things I have found the automobile section to lack. These are News, Helpful Advice written in interesting fashion, Human Interest and a Sense of Humor.

Before I have set down a line in amplification of my meaning as to the first of this quartette, my ears ring with anticipated protest of publicity writers. "News?" they will say, "Why, that's easy." Is it? We will begin with News and prove that it is one of the most serious needs of the four.

The story of the promotion of the Pacific Coast Sales Manager of a motor car company to the capacity of General Western Supervisor strikes the average motorist about as interesting as would similar facts in connection with a concern engaged in the manufacture of rubber boots. It is not news. Neither is there any avid joy for the motorist—or the ped—in the perusal of a tale about 4000 additional feet of floor space being hooked onto the present factory of the Gumph Tire Company at Uneeda City, unless the motorist who reads it lives in Uneeda and is out of a job.

We could go on indefinitely summoning old offenders upon the pitiless carpet of analysis, but it is unnecessary and a little cruel, and this proposes to be essentially a constructive effort.

Automobile races—the larger, the more legitimately—are news. New accessories and novel equipment are news. So, too, are brief, chatty stories descriptive of new models of cars. The eligibility of Good Roads and the development and improvement of bad ones is beyond question. Though most such stories of today are badly written, they deserve their place in the name of the motorist himself. Breezy items about local motorists are received with great interest, and articles regarding national movements in legislation and administration are solid gold. Begin with such news as this, and your automobile section has made a flying start toward real reader interest. But as the subject qualifies, so must the story be well written.

Helpful advice has almost as many definitions as there are persons paid to write it. The amount of it that comes to the desk of the automobile editor, sans the carmine and rouge of prostitution, is very, very small. There are whole divisions of practical-minded automobile experts thoroughly capable of writing it, but whether publicity writers do not sufficiently analyze lay reader psychology or whether, in adapting it they have strict orders to sprinkle the Name of Our Product liberally through each paragraph is not clear. At any rate, after the average publicity writer has the average bit of helpfulness ready for the multigrapher it makes mighty poor reading.

Suggestions as to how he can cut the cost of operation—and they are myriad—are a source of deep interest to the motorist. Stories pointing out how, through bad driving habits, he prevents his car from giving its best service—these, too, without constant interruption to say something about the Snifter Shock Absorber would find the owner-driver an eager reader. Economy; short cuts to emergency repairs; ways out of sudden serious breakdown; lectures to speed lovers; definitions of various unusual noises and peculiar actions in a car—these and hundreds more furnish an inexhaustible series of topics, each with innumerable subthemes.

What is Human Interest?

> **Who, I should ask before answering that question, who, of the readers of this article turn with pleasant anticipation to the Sunday automobile section of a newspaper? To the few of the trade group who may insist that they do read the pages of this section I should put another question; except for the advertisements, the headlines and publicity photographs, what, if anything, holds more than scanning interest?**

I can say "nothing," I'm sure, with little fear of dissenting opinion.

Why? Because there is almost no feature interest, no human entertainment in the stories upon those pages.

Most touring stories are dreary because of a very natural condition; that 95 per cent of the world does the reading, the other 5 per cent do the writing. Hence, the tourist, except as he is occasionally one of this minority is not able

*Director of Publicity, Motor Life and The Automobile Blue Books.

to tell his experiences in manuscript form. He fails because he is a reader and not a writer. Some newspapers will print such articles, but usually because the tourist is a dealer in some automotive thing or other, and the pictures he took will make a presentable layout. The article then appears in the newspaper that will print it—the newspaper, as a rule, that carries most of his advertising.

There is little or nothing of magazine interestingness about the automobile section. The human appeal is missing. The warm glow of humanity that is widely employed in automobile advertising does not find its way to the weekly automobile pages of newspapers. Except in remote cases, the pile of publicity patter that arrives in each morning's mail of the automobile editor is utterly devoid of this appeal.

Of Humor there is much to say. Not the least of the missing quartette is old S. of H. It is perhaps the greatest need of all. The whimsical touch of it, even in the automobile pages of today would be like washing a window in a deserted house. It would at least let the sunshine in. At present there is only the gloom, the very funereal gloom of deadly unreadability.

We need not turn to other fields for our humor. We need not even print jokes, which are humor in its lowest form. A good experience yarn, written by a humorist who knows cars as well as risibilities might cost us a little money and a little dignity, since the cars we build today are infallible and never give any trouble, but it would make a great hit with the motorist.

When it pops up in its natural place, nothing is responsible for such comfort, nothing brings ease to the human mind as does humor. It furnishes the theme for thousands of good automobile stories motorists seldom hear. (I refer to **women** motorists as well.) Does the publicity writer ever incorporate such story in his publicity campaign? Heavens, no! He'd have to stick in the name of the Lalla Rookh Spark Plug the minimum number of six times and, even if that didn't interfere with the telling, it would be a reflection on Our Product.

About now the reader may have given up wondering where the factory comes in. The factory, if it takes the trouble to investigate among average motorists and people who can afford to own cars, but doesn't, will find that the fond drivel that office boys carry in waste baskets to the post-office once a week for shipment to the newspapers has made a contemptible thing of the automobile section. Even the few who read it do not enjoy it.

Why continue to send out automobile stories—so-called—whose least harm, if printed, is nullification of the good that comes of automobile advertising, that appears in the same section? If there is nothing to attract and hold the reader's attention to the automobile pages, is it not likely that he will miss its advertising altogether?

It is here that the factory "comes in." (I choose to speak of the base of automobile publicity supply as "the factory" because of its source and because of the way most of it is turned out.) The factory comes in through purification—not necessarily sterilization—of publicity, by the establishment of real reader interest for the first time in fifteen years. At this moment, automobile advertising surrounded by such hoakum as now characterizes the automobile section loses whatever punch it has because so few readers get within striking distance. The automobile section of 1919 is like a store in which the finest goods are sold, but whose show cases and windows are repellantly dirty. It has only casuals. There are no regular customers.

Ask the automobile editor. Ask the city room. Ask the M. E. They know. Even on such newspapers as disassociate automobile advertising from automobile editorial matter, the business office is awake to the need.

It has been my good fortune to have been on both sides of the publicity fence—as automobile editor and as one-who-sends-him-publicity. In two years of correspondence contact with the automobile editor from the factory side, I have proved two things conclusively.

FIRST: That most automobile editors know how serious is the necessity for improvement.

SECOND: That improvement needs only the purpose.

Without lying, without vague promising of advertising to come I have secured extensive publicity from newspapers. They have printed it, not because it was brimming with human interest, not because it possessed in any degree the magazine quality to which I have referred above, but because it lacked the atmosphere of cheap press agentry that typifies most of the monotonous extravaganza they usually receive.

In the past year and a half, I have received letters from hundreds of automobile editors. I have come to know them by their first names. Yet most of my correspondence with them has been **multigraphed.**

Their expressions on the subject that is this article have been interesting. I have a few before me.

Says one automobile editor in Denver, "It is my opinion that the auto section is of little interest to most people outside the automobile field. Another, in Detroit admits that his position "**is merely to handle what publicity comes in—as a duty—not as pleasure, as most of it is stupidly unfit.**" A Houston correspondent writes as his unhappy conviction that though nobody else reads it, his auto section "must be composed of personal puffs of the dealers and their products, that's all." A New Haven editor believes that "Ninety-nine per cent of the auto stuff that comes to my desk is junk. The balance is quite as worthless."

What is the solution to the problem of publicity?

Throw out publicity altogether? Perhaps. If the automobile industry can't produce something that the motorist really wants to read, it might be best to dispense with publicity as a useless expense.

I do not think it is necessary to do this. The money that leases the brains in which thousands of brilliant advertising plans are annually born, will, if it dispose, discover and pay for the service of such brains as can produce a kind of automobile publicity in which the automobile owner—present and future degree—will find pleasurable reading.

The practice of placing responsibility for advertising and publicity with one man should be stopped. It is wrong. These two belong to the same family, but it is a most fatal error to call them twins. They require different handling, different treatment and it almost never happens that the training of one man makes him fit to direct the destinies of both. Publicity is editorial by birth. It never can be anything else and, when it has an advertising manager for a father, it is illegitimate. The man in charge of publicity should be as big a man in importance and income as the advertising manager. Too often he is only a handmaiden of the advertising department at a salary even less than that received by the assistant advertising manager.

The first thing to be done is to make the publicity man an editor. Give him a commission and take him away from kitchen police. Then give him some money to spend. It is impossible for any one human to possess the ability to write interestingly all the many kinds of stories necessary to make an automobile page.

I used the word "impossible" in a comparative sense. If one man did possess it, his salary would need to be more than that of the factory's president. Because this is so the publicity editor should take some of this money into the open market to find an author or two or ten who can write the feature stuff in magazine style.

Are the assistants on the publicity staff ex-newspaper men? Do they know the thing called "news"? Can they discover and write the sort of material that would pass the city editor of a daily newspaper? If not, the re-organization of his staff should be the first move of a freehanded publicity chief.

It is time to have done with present kind of publicity. Give the publicity man a real place in the automobile scheme. Create for him this job of publicity editor, pay him the sort of income intelligent and constructive effort deserve and make him prove his worth.

Medium Priced Car Popular in Panama

The automobile market in Panama is not very large, only 1,244 cars being registered there in 1919. Several garages are interested in jitney service and the fire department uses a number of cars. The four-cylinder five-passenger car is likely to find the best sale in the Canal Zone

APPROXIMATELY 1244 automobiles are in use in Panama and the Canal Zone, including the city of Colon, according to a report received by the Department of Commerce from the Consul General. Prospects for automobiles are not exceedingly large, due to the fact that the country is not a manufacturing one, is without large industries and is undeveloped agriculturally. The demand that exists is for medium priced cars from $750 to $1,500. There is no call for electrics. Business houses are using delivery trucks and the various Government departments are motorized.

"The cars registered in the Canal Zone," states the report, "for 1919 were as follows:

Personal	379
Hacking	289
Trucking	34
Official	242
	1244

"For all practical purposes this includes cars in the cities of Panama and Colon, as well as the Canal Zone, for few if any are registered in one place and not the other.

"Four or five garages in Panama are interested in the taxicab or jitney service and employ about forty to fifty cars, while there are some twenty-five or thirty engaged in this business, and employing from one to six cars each. Many of these cars are second hand, mostly purchased on the Isthmus.

"There are some twenty small delivery wagons and six or seven trucks, from two to five tons, in use by business houses and individuals in Panama city; the Department of Fomento has two trucks; the Police Department two patrol wagons and several cars, and the Fire Department about fifteen cars of various kinds in service. There are five large buses in the official jitney service of the Canal Zone, and the police, commissary and medical branches operate a number of cars, which appear in the above statistics under 'Official Cars'. The number of cars and trucks in use by the military authorities on the Canal Zone has also increased largely in the past two years."

'It might be well to remark here that while, as indicated above, the number of cars has greatly increased in the last two years, this does not, as might be inferred, represent by any means a corresponding increased prosperity in this business. The requirements of the military authorities and the Canal Zone Government have been responsible for a large part of this increase, which does not directly benefit the automobile business here, and other events, touched upon later on, have tended to some extent to injure the business in this city.

"The demand still, and it is not likely to change in the near future, is for a medium-priced car, from $750 to $1,500, there being only a very few high-priced cars here. The car in general use is the four-cylinder, five-passenger car, although a few six and eight-cylinder, seven-passenger cars have been imported in recent years. There are also a good many roadsters, a few of which are six and eight-cylinder. All of the well-known American makes are in evidence, many being represented by local agents. Last official statistics for 1917 show imports of automobiles and accessories into Panama, all from the United States, to have been $127,000. This does not include imports direct to the Canal Zone.

"Electricity is available for charging in the Panama Canal plant, and doubtless to some extent in the plant of the local company, the Panama Electric Co., but no electric vehicles are in use and there seems to be no demand for them at present. The correction of my previous statement to this effect, appearing in Commerce Reports, No. 158, of July 7, 1916, in which it was stated that a local business firm had imported an electric vehicle from an American firm may be so, but as far as I can ascertain, no one has ever seen this vehicle, and local automobile dealers know nothing about it.

"The principal area is at the Pacific end of the Canal Zone. This embraces the City of Panama and the Canal Zone as far as the Chagres river, and roads leading into the rural sections of Panama, known as the Sabanas District, in the direction of the ruins of Old Panama and the Juan Diaz river. The roads in this area consist of 21 miles of city streets in Panama, mostly narrow and irregular, but well-paved with brick, 17.3 miles of road in the Sabanas, in fair condition, and 48 miles in the Canal Zone. The total length of connecting highways suitable for motor traffic is 86.3 miles.

THE ATLANTIC END

"The area of second importance is the Atlantic end. This includes the city of Colon and adjoining town of Cristobal in the Canal Zone, having 8 miles of street and a concrete road to Margarita, a distance of 5 miles. A concrete road is also under construction to Gatum, a distance of 7 miles, making a total for the Atlantic side of the Canal of 20 miles. The Canal Zone roads are all, or will be, concreted during the present fiscal year, and are in excellent condition.

"The third area is on the west side of the Canal and embraces the three villages of Culebra, Empire and Las Cascadas, and a road leading from Empire to the Canal Zone boundary. The total length of roads in this area is 18 miles.

"The roads, as outlined above, are all good for automobile transportation and work of improvement and extension in the Canal Zone is being carried on at times.

"There are no appropriations for road extension in the Republic of Panama at present. This question has been under

The Motor Car in Panama

Cars, Trucks and Parts Exported from the U. S. A. to Panama
(Totals are for official fiscal years ending June 30)

	Cars	Value	Trucks	Value	Parts Value
1907	2	$ 1,170	Prior to 1913		$ 274
1908	7	4,296	Commercial Vehicle		1,273
1909	2	850	Statistics were in-		2,182
1910	13	13,289	cluded under the		3,180
1911	21	27,415	general head of		4,927
1912	20	14,271	"Automobiles"		4,689
1913	39	43,432	..	.....	11,738
1914	58	51,906	5	$ 7,243	16,988
1916	228	170,964	32	55,171	34,180
1917	356	216,711	75	97,970	56,657
1918	129	93,329	47	47,859	72,180
1919	69	61,786	45	44,753	.....

Dealers in Automobiles and Accessories, Panama City

abrt—Smallwood Brothers.
abrt—N. A. Pearce (Chalmers Garage).
b—Harry C. Nichols.
b—Panama Hardware (M. D. Cardoze).
abrt—Panazone Garage (Terbert).
ar—International Garage (Duque).
b—The Duque Co.

NOTE

"a" indicates agent handling both cars and accessories.
"b" indicates accessories only.
"r" indicates equipment and mechanics for making repairs.
"t" indicates vulcanizing plant, small or otherwise, for making all kinds of tire repairs, etc.

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consideration for a number of years and eventually may be put into effect.

"As to the bridges, over streams crossed by roads in the Canal Zone these are all of concrete construction and designed to carry the heaviest transportation.

"Several garages here have improved their condition somewhat in recent years, but none is doing a large amount of business at present.

MOTOR TAXES

"The import duty on automobiles and accessories is 15 per cent ad valorem.

"The tax on cars is now $5 a year in the Canal Zone for residents thereof; $25 for others. The tax in Panama is $25. However, a car registered in the Canal Zone pays an additional $1 for a Panama license, and vice versa.

"All cars must be registered and numbered, carry horns and have lights at both ends. The speed limit is being more strictly enforced, and chauffeurs must pass an examination before being licensed. In the Canal Zone, at least, this examination is being made more rigid in order to eliminate the many reckless and incompetent chauffeurs who have made motoring here in many instances in the past a danger rather than a pleasure.

"Gasoline is all imported from the United States, the present retail price being 42½ cents a gallon, with a slight reduction being made by some garages when bought in quantities from five gallons up.

"A number of inquiries have been received as to dealers in puncture proof preparations for filling tires, vulcanizing outfits, etc., and the enclosed list of garages and dealers in automobiles and accessories has been prepared to cover such inquiries as far as possible, and at the same time do away with unnecessary explanations.

"There are no vulcanizing plants here, the only complete one being at Balboa on the Canal Zone. Some of the garages either do a little tire repairing themselves or give space to private individuals who carry on such work on a very small scale.

"As of further interest in this connection I quote below from a letter received from one of the largest dealers in automobiles and supplies on the Isthmus, in answer to my request for information on the automobile business in Panama:

" 'Panama is one of the few countries in which the number of cars in use about equals the possible ultimate consumption according to the charts made up and published in the better trade journals. Since we began business here we have always planned, worked and arranged our prices with a view to a large volume in time.

" 'American visitors, tourists, have been the main source of revenue to the bulk of service car owners in Panama. On April 4, 1917 a condition of war was accepted against the Central Powers and since that time the tourist has stayed away from Panama and the service car owner has lost a great amount of business, and business, so far as the American manufacturer of cars and tires is concerned, was reduced to a minimum.

" 'At the same time a number of Army officers were ordered away from the Isthmus, or expected notification to leave at any moment, consequently a great amount of used cars were thrown on the market, thus eliminating the chance of our selling new ones.

" 'Business conditions since that time have grown more difficult from month to month and naturally we had to cut our organization to the minimum. The order keeping American troops and sailors from Panama seems to be the last straw that will break the camel's back.

" 'In regard to improving American commercial interests in Panama. This question opens up many things. We have continued annoyance, trouble and expense, owing to American houses paying no attention to making up consular papers. They, as a rule, usually handle the details of shipping and getting out the papers very carelessly—in fact, we really think this important work is usually handled by the office boy. No matter how we go into detail and explain, perhaps send them printed instructions, we are almost sure to have some trouble or other, taking at least half a day to explain and straighten out with the Government officials or the railroad.

STOCKS SMALL

" 'In Panama, owing to climatic conditions, it is impossible to place a large stock of cars and tires in storage. In normal times, no matter how we plan ahead we always lose a quantity of business on account of being out of stock. The American car maker, also tire maker, always seems to be far behind in the shipment of our orders. Even if we cable and know the goods are in or near New York it usually takes more than a month to get out papers and deliver goods to the steamer. Competition is very keen, and especially in this territory we have to go out and make business and work every opening to the limit to get by. The above is not an exception, but the rule, and something must be done to correct this if we expect to get this South American business in the coming years.' "

"The writer goes on to point out the many things that work to the disadvantage of those engaged in his business here, and states that several of the more prominent houses in the states, to whom his firm is well known, have suggested that they consider and examine carefully opportunities in the countries to the south, and that if conditions remain as at present here for any length of time definite steps will be taken to leave Panama."

THE Dutch Government has under consideration a bill for minting new silver coins for Holland and Dutch Indies with a silver content of .800 per 1,000. As the silver content of existing coining is at present still around 5 per cent below its face value, it will be seen that the Dutch Government is acting with foresight.

Concerning Plans to Adjust the Industrial Situation

Taking as his text the announcement that the Second Industrial Conference has drafted an adjustment plan upon which hearings will be held, Mr. Tipper notes numerous other plans now under consideration and expresses the belief that, if the leaders of labor and capital could read each other's minds, it would be found that there is really very little difference in their opinions as to what should be done for industry.

By Harry Tipper

THE Second Industrial Conference which was called by the President, has met and prepared a plan upon which public hearings will begin in the early part of January. There is nothing in this plan which can be recorded as advance over previous discussions, and it is notable merely for its omissions of certain things like collective bargaining which were discussed in the previous conference, and for an adaptation of the Whitley plan, which has received so much discussion in Great Britain.

We have previously shown the futility of attempting the use of machinery of organization from European countries because of the difference in the conditions, and it does not seem likely that this plan will offer any better opportunity than previous adaptations which have been discussed. The Monthly Labor Review of the Department of Labor at Washington has emphasized the Whitley plan a number of times, and has gone into considerable detail as to its workings. It is evident that this plan is looked upon with favor by the American Federation of Labor and that the weight of influence of that party will be exerted to further any proposition which deals with this system or with an adaptation of it.

> **The reason for this attitude is obvious. The Whitley plan is based upon the complete organization of workers into trade unions and the settlement of industrial questions through the combined machinery of the trade union's organization and the manufacturers' group.**

If this plan were officially encouraged and promulgated, the net result would be to strengthen the American Federation of Labor and to encourage organization into trade unions in practically every line of industry. In fact, the machinery can function only when the organizations are complete and take in all classes of workers from all lines of industry involved. The fact that it is encouraged by the American Federation of Labor, however, does not warrant an acceptance of the idea.

The machinery which is involved in the Whitley plan in Great Britain is clumsy, crude and inefficient in its workings, and up to the present it has satisfied neither the individual employer nor the rank and file of labor of that country. Its adoption has been necessitated by the complete organization of the workers into trade unions and by the long history of collective bargaining with those trade unions. The industrial groups have become so thoroughly organized in Great Britain into different organization lines that no settlement could be proposed which leaves the present machinery of organization out of its calculations, but this organization machinery is backed by a homogeneous people who have grown up under the same political conditions, with the same political ideals and with the same general habits of approach to national and social affairs.

There is established, therefore, a common ground of agreement upon many of the fundamentals which makes it possible for the machinery to function although it is not exactly suited to the purpose, and although it is clumsy in its effort, slow in its processes and inefficient in its final determinations.

> **It would be futile to attempt to adopt such machinery for the settlement of labor problems in this country, where the social and political conditions are entirely different.**

In this country we must deal with a population whose political background and subconscious psychological reaction varies from the almost tribal conditions of the Balkans to the highly organized traditions of the English nation. It is necessary to take into account the fact that there is little or no interest in national politics in this country, except in respect of a very few items. This lack of interest is thoroughly indicated in the attitude towards the Peace Treaty and the League of Nations. A very small percentage of the folks know anything about the treaty or have considered any of its provisions, and their political opinion upon it has been made up for them by the newspapers, by the action of their political leaders and by what their representatives say will be the effect of the treaty.

In Great Britain and in France, the situation is entirely different. Private correspondence with men of average attainments and interest in those countries, reveals a study of the provisions and the requirements of the treaty which would be unusual in this country, and reveals a judgment arrived at from that scrutiny which would be called rare. A study of the newspapers shows the difference in the character and extent of political interest.

Without any keen and abiding interest in national politics and without any common ground of political and social understanding, the Whitley plan or any similar plan would not only fail to perform its functions, but it might become very dangerous, because of the fact that its control would tend to center more and more in the hands of the politicians, whether such politicians were labor, socialists, republican or democrat, would not matter. Apparently, the only interest in the industrial disputes which exists in the minds of the public in this country is the interest caused by the interruption of the production and the high prices which prevail.

Under these conditions any National conference can do little towards the solution of the problem. The best it can do, is to crystallize and clarify public sentiment, to suggest elements of discussion and to emphasize the importance of the matter to the labor organizations and the industrial managers. A much more hopeful sign than the effect of this conference is exhibited in the tendency of some of the labor leaders to consider the strike and the imperative demands are worn as appeals for sympathy and bids for public opinion.

Several times lately, the remarks of labor leaders and the discussions at their conferences have shown that some of them at least are beginning to doubt the wisdom of the present methods of attack, and to think about constructing a different program.

The situation at present is particularly interesting to the observer, because of the fact, that leaders in finance and industry have been engaged actively in attempting to agree upon a program of constructive development and to use the best available means to bring that program to the attention of the whole public. At the same time, some of the labor organizations are working along similar lines.

All such movements take a long time to get on the way, and it is not yet apparent as to which of these movements will begin to roll first. When the powerful bodies of opinion on both sides of the matter consider means to be taken for constructive improvement, there is considerable hope of accomplishing some of the improvements within a reasonable time. The last ditch fighter is being relegated to his proper position as a man to be called upon only in desperate emergency.

> **If manufacturers were aware of the things which are going on in the small conferences between some of the more able leaders of labor, and the things which are going on in equally private discussions between the able leaders in finance and industry, they would be amazed at the similarity in the proposals and the extent of agreement between the problems.**

The present situation emphasizes more than ever, the fact that most of the disturbance is due to a lack of understanding on each side and consequently a lack of faith. There are some labor leaders who are frankly politicians, out for all they can get in influence, in power and in authority, and there are some manufacturers who are frankly out for all they can keep without respect to anybody else, but on neither side are these men the most able or the most authoritative in their fields, and they do not represent the important volume of opinion.

In the meantime, the number of plans advanced in public by various individuals of more or less authority increase at a rapid pace. It is an unusual week which does not bring at least one or two such plans to my desk. Every man who has theorized upon this subject, and a good many of the men who have been successful in overcoming some conditions in a restricted way are impelled to write their conclusions in pamphlets, speak them at banquets, and stir up the public to adopt them.

This multiplicity of plans would be confusion if it were necessary to take them all seriously as plans. Boiled down, there is very little difference between them, and most of them are not plans at all, but merely preliminary sketches, so that they are unlikely to become working drawings. Many of them are good to look at, however, and they keep the interest stirred up so that the question is not forgotten when the immediate problem has disappeared.

The only danger from the situation arises out of the tendency on the part of some of these plan-makers to get a Congressman interested and try to impose their plan upon the nation by means of a new law. All such attempts should be discouraged, and if necessary, fought very thoroughly.

> **No regulation at present contemplated is likely to be sufficiently wise to encompass all the necessities of the situation, and the character of our government is not such as would warrant optimistic ideas as to its capacity for human wisdom or its efficiency in the enforcement of law.**

There is sufficient danger of the introduction of some of these regulation, however, to make it advisable to emphasize this point just a little. We already have more laws than any other five nations combined, and we are piling them up at a pace several times greater than they are being enacted in Great Britain so that we are in some danger of being hand-bound and hog-tied by these laws as it is. Further regulations are not to be looked upon with anything but alarm and the best efforts of industry should be opposed to it.

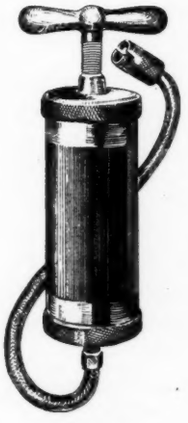
The Alemite Lubricating System

A CHASSIS lubricating system, known as Alemite lubrication, has been developed by a Chicago concern, with a view to obviating the trouble and messiness of the ordinary grease lubrication. The ordinary grease and oil cups are eliminated, and nipples containing ball check valves are substituted therefor.

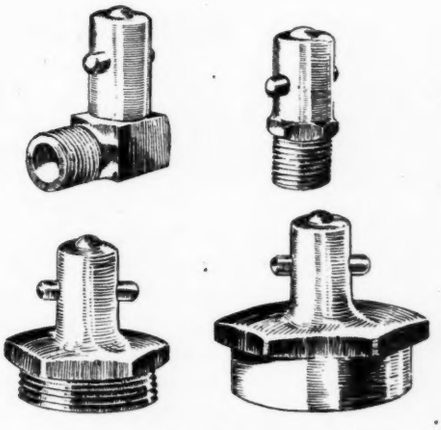
A compressor or grease gun of special construction, with a 15 in. flexible steel hose, is adapted to connect to these nipples by means of a bayonet joint, and grease can then be forced into the bearings through these check valves under a high pressure, which insures that lubricant will reach the remotest parts of the bearings.

The cylinder of the compressor is made of No. 16 gage steel, knurled to prevent its turning in the hand. The compressor, with delivery hose complete, can be readily stored in the tool box. Ball check valve nipples are made in four sizes, viz., $\frac{5}{16}$ in.-32, $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{3}{8}$ in. standard pipe size; they are made both in the straight and elbow type, the latter being used to make inconvenient places more accessible.

For cars already equipped with grease cups integral with the shackle bolt, the Alemite Metals Co. furnishes a cap and nipple complete, which is substituted for the old cap of the shackle bolt. In use, the bayonet coupling is hooked to the nipple, by placing the steel protector opposite the coupling slot and by a slight pressure forward and a turn to the right an absolutely tight joint is secured. The flexible hose enables the operator to fill the bearing with grease in a comfortable position, and to force the grease into the bearings under a high pressure, up to 500 lb. per sq. in., necessary.



Alemite compressor



Alemite ball check valve, nipples and cups

It is claimed for the Alemite System that it permits of lubricating a car in much shorter time than where grease cups have to be filled in the ordinary way, and, besides, it is not necessary to grease the car so often.

AUTOMOTIVE INDUSTRIES
THE AUTOMOBILE

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Better Cars

ONE of the most encouraging features of the present condition of the industry is the better quality of the present product. It is impossible to walk through Grand Central Palace, without becoming inbued with the thought, that, without exception, makers have improved their products both in design and workmanship. The third factor, that of materials, is of course not apparent to the eye, but a study of what has been done in this respect shows that improvements here are even greater than in the other two fields.

In fact, we are about to have some important additions to the family of available materials. One of the additions, exhibited publicly for the first time at the present show, is the aluminum forging. Connecting rods, steering levers, etc., of this new material are on exhibition, as well as castings for truck and passenger car axle housings. Any automobile engineer will recognize these as tremendous steps toward the reduction of reciprocating and unsprung weights, two matters that have had the closest attention for years, but in which no such strides as the new development promises, have ever been taken.

As for design, it would be impossible in the limited confines of this editorial page, even to begin to discuss them. Intake manifolding alone has been studied and developed to such an extent that the relatively heavy fuel of today is handled in a far more efficient and certain manner than the lightest of the earlier gasolines. Oil pumping, which has been the stumbling block for many an otherwise well-developed design, has been cured by some of the new forms of pistons, according, at least, to the manufacturers who have developed them. There is not a part throughout the car that has not been refined to some extent.

Workmanship is better, and, taking the summation of improvement in these three branches, materials, design and manufacture, the resulting better cars are a source of pride to the industry. One cannot leave the show without a feeling that there is not a manufacturer who is not making a better product for 1920 than he ever made before.

The New York Show

THE twentieth annual New York automobile show now running is worthy of the preceding exhibitions. Fully representative of the industry for the benefit of which it is organized, it is drawing large crowds, and, to judge by reports, the buying sentiment is quite strong. However, the volume of sales is of less immediate consequence this year than it has been for some time, to the majority of exhibitors at least, on account of the fact that they are "sold up" for long periods in advance. Under the circumstances, the show bears more the character of an educational and propaganda enterprise than that of a sales mart.

The value of the educational feature is emphasized by the large number of sectioned chassis on view. In the earlier shows, the polished chassis was a device used by many exhibitors to draw visitors to their stand. This was instructive enough to the expert and those with a fair knowledge of automobile mechanism, but it meant little to the novice. It was soon found that sectioned cylinders and parts shown in motion were a great magnet for the crowds, and a logical consequence was the adoption of the sectioned chassis as a conventional exhibition article.

As usual, the annual convention of the Society of Automotive Engineers is again being held during show week and many engineers are in the city. From an engineer's standpoint, the show this year is most instructive. When we speak of the show here, we mean all the exhibitions of automotive apparatus at present being staged in New York, which includes the regular exhibitions of passenger cars at the Grand Central Palace and Sixty-ninth Regiment Armory and of trucks at the Eighth Coast Artillery Armory in the Bronx, besides the numerous private exhibits of cars and parts in hotels and in business buildings near the show buildings. There is a goodly number of new cars, both by new concerns and by long established ones and all these embody the most up-to-date features.

It is not necessary here to go into mechanical details, as the subject is covered elsewhere in this issue, but it is apropos to point out that the show, besides serving as a means of educating the lay public, is most instructive to engineers as well. The big array of cars, so staged that their mechanical features can be studied with the greatest convenience, offers the best opportunity of gathering first hand information on the latest engineering practice and, no doubt, many points will be picked up that can be applied to advantage in the design of 1921 models on which work will be begun shortly.

What Shall We Name It?

AMERICANS are in the habit of labeling things and then classifying them according to their label, said a speaker to a group of New York advertising men recently. If the label is one which calls forth undesirable reactions, the thing will be classed as undesirable. Consequently, the label should be chosen with great care. More than one employer's plan to benefit his workers and make them more contented has failed because the department under which it operated was called by an unfortunate name.

Many "welfare" plans have been conceived in the best spirit possible and operated in an effective manner but have failed because workmen "hate to be welfared." The term "welfare department" might be suitable for a branch of a charitable organization, but it is not suitable as a name for a department in a modern industrial organization. The term "service department" has taken its place as a name for the department in a plant which has to do with making workers more contented and the lives of workers more congenial and happy. The term has been chosen as more properly designating the purpose of the department and the spirit of its establishment. Some authorities, including Mayer Bloomfield, favor the further designation, "Employees' Service Department" as better expressing the idea that the department not only works for the employees, but also to a large extent with them and through their efforts. This latter term is particularly suited to the automobile trade since it eliminates any possible confusion with the service department for customers already established in most automobile concerns.

The first task of a motor service manager is to "sell" himself and his department to the men of the plant. When he is handicapped with the charity-sounding title of welfare manager his sale is at lease five times as hard to make.

One firm of national prominence has a department which sees that rules are obeyed, that the employee is properly introduced to the company and made familiar with its practices, that workers are reprimanded in the proper way, that the matron's service is kept efficient. The spirit of this department is one of broad humanitarianism, as expressed by the present head of it. It works with the good of the worker in view at all times, operates along lines of highest regard for the human element, and undoubtedly is a very great potential power for good in the factory. But Shades of the Hickory Stick, the head of this department is called the Factory Disciplinarian! The good that this department accomplishes, and there is probably a great deal of it, is certainly accomplished in spite of the name of its head. How many full grown men would naturally be attracted by the title "Factory Disciplinarian?" The man who bears this title has, in accomplishing his work which necessitates "selling himself" to the men, a very difficult task; a task which would be much easier had he been designated by some term which more closely described the broad spirit in which the work of his department was conceived. A title such as Supervisor of Rules & Regulations might be more suitable.

The spirit of the work should be expressed in the name of the department. The name should be one to attract the worker. A man may look for service and retain his self-respect; many do not see "welfare" in the same light. The work of departments of this nature depends for success almost entirely upon the ability of the department head to sell his service to the employee. Any product that is to be sold successfully needs a good label. No manufacturer would advertise "Skid-Easy Tire Chains" and expect the public to understand that the chains stopped the car from skidding. Likewise, it is difficult to convince workmen that a welfare department is really an employees' service department.

Stolen Trademarks

IT is interesting to note the interest created among manufacturers of automotive vehicles by a newspaper dispatch printed during the New York Show, stating that an enterprising Portuguese automobile tradesman had taken advantage of the trademark laws to register in several European countries the trademarks by which 43 American cars are known. It is probable that this man is patiently waiting for some of the American manufacturers to ask him his price to sell them what should be their own rights.

Some of the makers were amazed as this turn of affairs but there is little reason why they should be even mildly surprised that they have been robbed of their rights. It certainly was not because they have not been warned. Speaking for AUTOMOTIVE INDUSTRIES, we can say that repeated warnings have been given as to the liability of a copyright to be stolen, and we have told many times of similar, if less extensive, robberies of this kind. Also these columns have pointed out many times the way by which the manufacturer could protect his trademark at a nominal expense.

The trademark specialists have advertised extensively to obtain customers for their service and they have taken very good care of those who became their clients. But there were many manufacturers who were actually selling cars abroad who did not protect their trademarks. Some manufacturers, despite warnings, permitted their agents abroad to register their trademarks and when the occasion arose to change agents, they found that they could not because the smart agent had registered the trademark as his own. Of course, this involved a settlement and some have been costly.

Just as a word of warning, we might say to any manufacturer who has not registered his trade mark abroad, or whose trademark has not been stolen:

ACT AT ONCE.

PROPOSE NATIONAL INDUSTRIAL BOARD

Second Capital and Labor Conference Suggests Means to Arbitrate Disputes

WASHINGTON, Jan. 2—Creation of a national industrial tribunal and regional boards of inquiry and adjustment for the settlement of all disputes between labor and capital is the chief recommendation in the preliminary report of President Wilson's second industrial conference, which is to reconvene Jan. 12.

The National Industrial Tribunal, according to the report, will have its headquarters in Washington and be composed of nine members chosen by the President and confirmed by the Senate. Three shall represent the employers of the country and shall be appointed upon nomination by the Secretary of Commerce. Three shall represent employees and shall be appointed upon nomination of the Secretary of Labor. Three shall be representatives of the public interest. Not more than five of the members shall be of the same political party.

The tribunal shall be in general, points out the report, a board of appeal. Its determination on disputes coming to it upon an appeal shall be by unanimous vote. In case it is unable to reach a determination, it shall make and publish majority and minority reports which shall be matters of public record.

France Makes Oil Plans for New Year

PARIS, Dec. 13—(Special Correspondence)—Petroleum has been discovered in the French possessions in Morocco, at Djebel-Telfat, near Petitjean. On the first boring, petroleum flowed at the rate of three tons per day. It is intended to drill 12 wells in 1920.

It is the intention of the government department charged with the supply of gasoline for France, to improve the working of the petroleum wells in Alsace. This source of supply has been returned to France by the Peace Treaty. The most important wells are at Pechelbronne. The annual output before the war was about 40,000 tons of petroleum.

According to an official statement, the stocks of gasoline in France on Dec. 1 were 80,000 tons, this being equal to 2½ months average supply. The stocks of kerosene were 90,000 tons, or 3 months' supply; there were also 30,000 tons of fuel oil, being two months' supply.

During the month of November the sale of gasoline and kerosene in France reached 70,000 tons, this being the highest figure on record. The amount would have been greater if transportation facilities had been better. In order to improve the supply for the district of Paris, nine new tank trains will be put into service between Rouen and the capital. Each of these trains will have a capacity of 400 tons.

A project is afoot and seems likely to be realized of laying a pipe line from Havre to Paris for the delivery of fuel oil. Three months ago the French consumption of fuel oil was only 2,000 tons per month. It is now 40,000 tons, and is expected shortly to increase to 150,000 tons per month. One of the greatest difficulties is transportation, and it is on this account that the government has given favorable consideration to a private project to construct a pipe line from Havre to Paris. The length of this line will be 140 miles. It will take a year to build it.

Probe Sustained Price Guarantee

WASHINGTON, Jan. 2—The Federal Trade Commission is investigating the question of guarantee against decline in price by manufacturers and jobbers. Many complaints have come before the commission and opinions seem to be so diverse that the investigation was found necessary; consequently all parties interested in the question of guarantee against decline in price are invited to present their views before the commission including producers, manufacturers, wholesalers and retail merchants and consumers. A general hearing will be called at this city, the date of which will be announced later, at which time parties interested may be present in person.

India Has Only 163 Cars Not American

NEW YORK, Jan. 2—"The extent to which the Indian market has been captured by America is shown by the figures just issued by the Statistical Office, Bombay, for the last six months. Out of 3,202 cars imported no fewer than 3,039 were American."

This bit of news is published in "The Motor," the British trade paper.

PANAMA NOT FOREIGN MAIL

WASHINGTON, Jan. 2—The postal rate from the United States to Panama and the Canal Zone is the same as our domestic rate, 2 cents an ounce, states a report from Consul Snyder. While there are a few instances of underpaid postage, many American houses overpay at the regular foreign rate of 5 cents an ounce. Many letters are received from firms and individuals with special delivery stamps attached. There is no special delivery service in either Panama or the Canal Zone, and the use of such stamps is a loss.

TO BUILD BODY PLANT

PHILADELPHIA, Jan. 3—H. G. Smith & Bro., Scranton, have purchased the property at Wyoming avenue and Walnut street, that city, as a site for a new factory for the manufacture of motor truck bodies, wagons, automobile and truck springs. Repairing of trucks and passenger cars will be a feature of the new business. Wheels for motor and horse-drawn vehicles also will be made.

CHRYSLER JOINS WILLYS COMPANY

Former Buick President Will Take Part in Struggle for Car Supremacy

DETROIT, MICH., Jan. 6.—Walter P. Chrysler, former president and general manager of the Buick Motor Co. and vice-president and personal assistant to the president of the General Motors Corp., has joined the John N. Willys organization. With the announced intention of the Willys Chrysler combination to seek domination of the four and six cylinder car field, a struggle is on for supremacy in the automobile industry.

Rumors have persisted since Chrysler's rather sudden determination to leave the General Motors' forces, that he would seek an advantageous spot from which to launch an offensive for control of the field now under the sway of the Motors corporation. This withdrawal was said also to have followed a wordy war with President W. C. Durant. News of the alignment with Willys, following recent activities of the Willys Overland Co. and the Willys Corp., occasioned considerable surprise.

Chrysler, who will be designated officially as executive vice-president and general manager of Willys Overland Co. and the Willys Corp., will have his headquarters at New York, close to John N. Willys, where they will formulate the policies by which they hope to make the corporations the largest producers of their respective models in the world. Chrysler will take up immediately the work of development of the large production plans of the various Willys companies for this year.

It was Chrysler who transformed the Buick Co. from a modest western plant, with a capacity of 50 cars a day, into the third largest automobile company in the world, with a daily output of 550 cars and annual profits of $40,000,000. Chrysler was called to the position of works manager of the Buick factory Jan. 11, 1915. Eighteen months later he was made president and general manager and three years later, early in 1919, he was made vice-president of General Motors and personal assistant to Durant.

Chrysler is 44 years old and began life as a sweeper in a railroad round house at Ellis, Kan., his home town. From sweeper he went to grocer's boy, then to mechanic and to roundhouse foreman. He became general foreman of the Colorado Southern shops at Trinidad and later superintendent of motive power for the Chicago Great Western. At 33, he jumped to the general managership of the American Locomotive Co. Works at Alleghany, Pa.

"COST MARK" BILL TO TRY CONGRESS AGAIN

Would Defeat Profiteering by Requiring Cost Stamp on All Goods

WASHINGTON, Jan. 2—Considerable interest is shown here in the "cost mark" bill introduced last August by Congressman Siegel of New York, and which, together with other bills of similar nature, met with such opposition for the time being that it was thought that they were definitely "killed." It is now declared that the advocates of the "cost mark" plan have every intention of furthering it.

The Siegel bill would force every manufacturer, jobber, wholesaler and retailer engaged in business as a producer, manufacturer or distributer to license his business with the Internal Revenue Department for the sum of $10 per annum. The issuance of a license to an individual or concern engaged in business would carry the obligation that any article of goods offered for sale would have to be plainly stamped or printed to show the cost price, not including the drayage, freight, carriage charges or discounts.

The bill would provide a penalty of a fine of $5,000 or imprisonment for two years, or both, for violation of the act, including also a revocation of the permit or license to do business.

Of course there is a formidable antagonism to the bill and to any such plan as this bill contemplates, and up to this time it has not seemed likely that this bill or any of the similar bills would meet with even the slightest encouragement in Congress. However, at present it is reported here that following completion of the railroad program the advocates of the "cost mark" plan will again press the committee to open public hearings on the scheme, which is intended as a panacea for profiteering.

Rules Trucks Must Conform to Law

PHILADELPHIA, Jan. 2—The Motor Truck Association of Philadelphia has been informed by the State Highway Department that owners of large trucks unable to procure adequate lighting appliances because of manufacturing difficulties, will be granted registration licenses on their promise that they will get lights as soon as possible.

Commissioner Sadler states that of the 500,000 motor vehicles in Pennsylvania in 1920, probably 50,000 will be trucks. The rights of the other 450,000 owners of cars, he argues, must be respected and protected. Regulations which apply to passenger cars and to small trucks equipped with illuminating devices must apply to the larger trucks.

Representatives of the Motor Truck Association informed Commissioner Sadler that large trucks are not supplied with lights other than oil signal lamps on each side and that electrical devices for them have not be found generally practical.

"Manufacturers, in view of the Pennsylvania laws," said Sadler, "should begin to supply adequate lights and their engineers should develop a practical lighting system. There is the law; I cannot modify it."

The commissioner called attention to the fact that many trucks from the cabs of which drivers are unable to see back of them, are not equipped with fender mirrors, or other mirrors. The law in this particular, asserts Commissioner Sadler, will be strictly enforced.

Air Brake Company Takes Contract for Trucks

WATERTOWN, N. Y., Jan. 2—The New York Air Brake Co., which has been working on a trial order of 50 six-ton trucks for the Three Point Truck Corp. of New York City, will continue to make trucks for the concern. According to the vice-president of the New York Air Brake Co., John C. Thompson, the air brake company will turn out 150 trucks per month, following the completion of the trial order.

The Watertown factory will also venture into the passenger car line, a new car having been designed which is equipped with a super heater for the gasoline system. The work upon the first of the new cars will start at the factory in January.

The Air Brake Co. is also working upon a tractor model.

A considerable floor and factory space will be needed to handle the several new lines. The company is expecting to take over the government buildings erected upon its property during the war, and which were used during that period for the manufacture of projectiles and gun carriages.

FIRESTONE MEN TO BOWL

AKRON, O., Jan. 2—The first national telegraphic bowling tournament ever held is being arranged by the Firestone Tire & Rubber Co. It will be bowled simultaneously in 63 cities on Feb. 4, all teams to be composed of bona fide Firestone employees. The Partridge Championship Trophy will be awarded to the team scoring the largest totals in the three games, and it will be declared Firestone Champion for 1920.

The Fairbanks cup will go to the bowler having the highest average for three games, while the team scoring the most pins in one game will receive the BeSaw cup. Telegraphic reports in code of the games must be filed twenty minutes after the games are over and must be confirmed by mail. Allowances for time in different regions have been made so that all teams will be bowling at the same time.

Trade Conditions In Europe Good

MILWAUKEE, Jan. 5—Carl G. Hayssen, of the Sterling Motor Truck Co., Milwaukee, who left Sept. 15 for Europe to investigate conditions with special reference to export requirements of motor trucks, has returned with an encouraging report of conditions. Hayssen spent three months in England, France, Belgium, Germany, Norway, Sweden and Denmark. He sums up conditions thus: "Europe is recovering rapidly from the effects of the war, and business conditions are uniformly good everywhere. The most marked characteristic of England is that there is a strong disinclination to work. Production is at low ebb because of short hours and apathy among labor. American manufacturers appear to have many friends in Europe. Germany seems to be anxious to enter trade relations with us and with England as well. There is marked ill feeling toward France and Belgium."

France Faces Year of Tire Shortages

PARIS, Dec. 6—(Special Correspondence)—A serious tire famine prevails in France and is rendered more acute by illegal profiteering and wild speculation. War contracts have only recently been cleaned up, but tire manufacturers are far from being able to meet requirements. It is estimated that the shortage will continue for the whole of next year.

Motor traffic has increased enormously since the war, and all cars which were laid away during hostilities have had to be fitted with new tires to replace those perished by age. Although tire quality is higher than ever, tire mileage is low, by reason of bad road surfaces. Not only has all civilian France been starved for five years, but all surrounding countries have been deprived of tires and are now ready purchasers, almost irrespective of price.

Profiteers have taken advantage of this situation and when able to secure tires have shipped them into Germany, where they are sold at an increase of 40 to 100 per cent above list prices. This business is so profitable that those taking part in it send automobiles loaded with tires specially from Paris to Germany, a distance of 600 miles for the round trip.

Recently the police have taken action and have rounded up an important gang of tire profiteers. Among these persons is the general manager of a big French tire company, who supplied tires to his associates, to the detriment of other clients, and then shared with them the high profits obtained on the transaction. There are charges against this gang of receiving stolen army stocks and of getting tires by means of priority certificates to which they were not entitled.

BRITISH FOUNDRY STRIKE NEARS END

Basis of Settlement Seen in Employers' Concession to Discuss Terms

LONDON, Dec. 16—(Special Correspondence)—There seems a near prospect of the disastrous molders' strike being settled. The men are still holding out for their demanded advance of $4 weekly, while the masters hold by the award offered of $1,25, but are understood to be willing to waive their condition as a preliminary to discuss the terms, namely, that the men must return to work before matters would be discussed by them.

As bearing on previous information and comments on the British foundry industry, the following note of an address last week by J. R. Hyde, head of one of the big foundries at Sheffield, has some interest, especially as it discusses the relative conditions and output of American and British foundries.

Hyde spoke of the molding machinery he saw in operation and of his visits to certain American foundries, and said that labor in the United States is almost invariably paid by piecework or a bonus system, each man making the best of himself for himself.

The average foundryman there, however, has nothing like the knowledge of his British comrade, but he turns out vastly more. In a foundry making castings similar to those at his (Hyde's) works, he stated that just twice the number of molds were put down per man in a nine-hour day for an earned wage of $6 the day. The actual molding cost in the American factory is only 60 per cent of the cost in Sheffield, and though a certain proportion of the 40 per cent difference might be swallowed up in interest on the labor saving devices employed, there is no doubt Americans produce cheaper castings than the British.

It seems that the point of this critic's remarks concerns rather the masters than the men. If American foundries and molders are turning out double the rate of British foundries, it is because of their being equipped for that purpose, and without mechanical aids it is obvious that hand molding cannot produce anything like that output. Hand labor seldom can be speeded up to show any marked increase of output, because the limit of human endurance is much sooner reached, but given suitable mechanical plant, and labor saving aids the increased output becomes automatic, and at less cost in human effort than a very small increased output by hand labor.

Moreover the comparative dearth of mechanical aids to molding and foundry work in Great Britain has a bearing on the inferior cylinders and other castings, which the motor industry has been experiencing since the war; as much as 80 per cent of wasters including castings is reported in some quarters. The molders' strike is now in the thirteenth week, and besides the 150,000 molders on strike, some 80,000 other workers have been compulsorily thrown idle, and another 150,000 men are working only two or three days a week. The monthly loss is estimated at $50,000,000.

A molder in a contribution to the daily press states the position of the molders as follows: "The average time-work rate of the molder in 1914 was $8 a week. The present average weekly rate is $15.50, an advance of 92 per cent, but the cost of living at the present time, according to the Board of Trade returns, has increased 125 per cent since 1914. The $4 now under application represents the difference between 92 per cent and 125 per cent.

Englishman.

Firestone to Strive for $150,000,000 Goal

AKRON, O., Jan. 2—Firestone Tire & Rubber Co. has set $150,000,000 as the goal of its selling organization in 1920. This figure was announced at the recent annual meeting of stockholders, when the 1919 sales were reported as $91,078,513.70, an increase of $15,277,006.91 over the year previous. It was further announced that the company would pay an extra dividend of $2 a share to stockholders of Dec. 15 record, and that the directors looked forward to putting each quarterly dividend on that basis.

Three new vice-presidencies were created by the board of directors and were filled as follows: A. G. Partridge, vice-president in charge of sales; J. W. Thomas, vice-president, in charge of manufacturing; Thomas Clements, vice-president, in charge of offices and purchases. Officers re-elected were: H. S. Firestone, president; A. C. Miller, vice-president and general counsel; S. G. Carkhuff, secretary, and J. G. Robertson, treasurer.

Directors elected were: H. S. Firestone, A. C. Miller, L. E. Sisler, S. G. Carkhuff, J. C. Robertson, J. W. Thomas, Harvey S. Firestone, Jr., A. G. Partridge, C. A. Meyers and T. Clements.

Place Contract for Willys "6" Castings

NEW YORK, Jan. 5—One-half of the motor castings required by the Willys Corp., for the manufacture of its new light six at the Elizabeth, N. J., plant will be furnished by the Lycoming Foundry & Machine Co., of Williamsport, Pa., according to the terms of a contract recently entered into.

To take care of this contract the Lycoming company has purchased fifteen acres upon which a new foundry 700x160 ft. will be erected. The new building is expected to be finished in the spring of 1920 and it will be in production in August. The company with its new plant will have a capacity of 1,200 sets of motor castings a day.

Hold Two Tractor Trials in England

LONDON, Dec. 16—(Special Correspondence)—As already announced there will be separate trials of tractors and farm-tractor implements next autumn in England, respectively by the Society of Motor Manufacturers and Traders, and the Royal Agricultural Society of England: The latter body's program is as follows:

There will be six classes, with a gold medal and $100, and a bronze medal and $50, by way of awards for each class as follows:

Class 1. Internal combustion direct traction engine not exceeding 30 b. h. p. suitable for ploughing two or three furrows, 10 in. wide by 6 in. deep.

Class 2. Internal-combustion direct traction engines over 30 b. h. p. suitable for ploughing four furrows, 10 in. wide by 8 in. deep.

Class 3. Direct traction steam engine plant, suitable for ploughing four furrows, 10 in. wide by 8 in. deep. Engines to comply with the requirements of the Light Road Locomotive Acts.

Class 4. Internal-combustion double engine set, with wire-rope haulage, for ploughing three or four furrows, 10 in. wide by 8 in. deep. Engines to comply with the Light Road Locomotive Acts.

Class 5. Double steam engine set, with wire-rope haulage, for ploughing three or four furrows, 10 in. wide by 8 in. deep. Engines to comply with the requirements of the Light Road Locomotive Acts.

Class 6. Self-propelled plough for ploughing not more than four furrows, and not more than 10 in. wide and not more than 8 in. deep.

The latest date for receiving entries is Mar. 20. The event will take place during the first week of October in one of the English midland countries. The offices of the R. A. S. E. are at Bedford Row, London, W. C.

MOVE WESTERN OFFICE

NEW YORK, Jan. 2—The Des Moines office of the H. W. Johns-Manville Co., has been moved to larger quarters at 213 Ninth street.

HOLD MONTANA SHOW

GREAT FALLS, MONT., Jan. 2—The Montana Automobile Distributer's Association will hold its fifth annual automobile show, Mar. 15-20, 1920, at Great Falls.

SALESMANAGER PROMOTED

AKRON, O., Jan. 2—Marshall E. Morris, manager of the Goodyear Tire & Rubber Co.'s salesmen's department, will leave Akron for Los Angeles in January to become assistant general manager of the new California Goodyear Co., and a member of its board of directors.

FRANCE REDUCES TAX ON CARS AND PARTS

Lowered From 70 to 45 Per Cent to Correspond to American Tariff

PARIS, Dec. 31—(Special Cable)—Passenger car and parts import duties have been reduced from 70 per cent ad valorem to 45 per cent, and it is announced that a further reduction is possible.

The duties on trucks remain unchanged.

The report on which the decree of reduction in duty is based states that the automobile industry of England, Belgium, Italy and France is agreed that a uniform tax of 33 1-3 per cent should be exacted among these countries, but, as the American tariff is 45 per cent, the French tariff is reduced to the same figure, with the understanding that a further reduction to 33 1-3 per cent is possible if the United States adheres to the agreement.

Steel Tires Barred From New Orleans

NEW ORLEANS, Jan. 2—The "rubber tire law" went into effect in New Orleans, Dec. 22. The ordinance making it unlawful to operate any motor vehicle or trailer with steel tires, was passed five months ago, giving automobile owners three months in which to comply with its provisions. When the three months expired, however, so many truck owners declared they had not been able to meet the requirements, the application of the law was withheld until Dec. 22. The city government refused to extend it further.

Dealers in Florida Form Association

ORLANDO, FLA., Jan. 8—At a convention held here in December, 200 dealers, representing every section of the state, formed the Florida Automobile Dealers' Association. Plans for immediate incorporation and affiliation with the National Automobile Dealers' Association were made.

The enthusiasm that attended this first organization of the state dealers is shown by the fact that 76 of their number wrote checks then and there and tendered them to the secretary in payment of the first year's dues. A membership campaign is to be started immediately to increase the roster to 500.

The officers elected were: Claude Nolan, of Jacksonville, president; Joe Thorpe, of Miama, vice-president; D. F. Owen, of Tampa, treasurer. The board of directors is comprised of five members, one from each of the four congressional districts, and one director at large. C. C. Kirby, of Jacksonville, was chosen director at large. The others were: Ray B. Crall, Tampa; J. R. Fowler, Gainsville; J. P. S. Houston, Tallahassee; I. W. Phillips, Orlando.

C. C. Kirby was temporary chairman and earned considerable praise for the successful manner in which he handled the preliminary deliberations of the body. Mayor Giles welcomed the dealers to Orlando, and Harry G. Moock and George B. McCutcheon, of the National association and Pyke Johnson, secretary of the highways committee of the N. A C. C., were among the principal speakers.

The organization is pledged to work for statewide co-operation of dealers, better trade facilities, better highways and adequate protection.

Publication of this issue of Automotive Industries has been delayed until Jan. 11 by conditions over which the publishers have had no control.

Hold Sicilian Cup Races in the Spring

PARIS, Dec. 6—(Special Correspondence)—Two races will be held in Sicily next spring. One will be for the Targa Florio, and the other for the Florio Cup. The probable date of these races—for the two will doubtless be held on the same day—is May 2.

The Florio Cup will be competed for by 183 cu. in. racing cars, which will have to cover 5 laps representing 335 miles of the most difficult mountainous course. The Targa Florio will be for stockcars entered by either manufacturers or owners. These cars will be divided into classes according to their cylindrical area. Four laps of the same course will have to be covered, the distance being 268 miles.

The Sicilian races date back to 1905, and have always brought together the best drivers to be found in Europe. The course selected is admittedly one of the most difficult in the world. Only the best drivers can hope to win under such conditions, and any car which stands up at speed on this Sicilian course is undoubtedly a well built machine.

Details on the races have not yet been prepared.

MILBURN CONTINUES WORK

NEW YORK, Jan. 5—From General Manager R. S. Woodhull of the Milburn Wagon Co., of Toledo, it was learned today that the company would proceed immediately with its production schedule in the building erected at Toledo University for training Motor Transport Corps recruits during the war. The main plant of the Milburn company was destroyed recently by fire. Plans of the company were announced in New York by Woodhull, who is attending the national automobile show.

All Space Taken For Chicago Air Show

CHICAGO, Jan. 2—Success seems assured for Chicago's first Aeronautical exhibition which is scheduled to open at the Coliseum, Jan. 8 and run for the following week. Every square foot of exhibition space has long ago been taken by members of the Manufacturers' Aircraft Association, and the show management has promised a complete exhibition of the 1920 models of the industry.

This is Chicago's first venture into the aircraft field, although one of the leading passenger car dealers here, the James Levy Motors Co., has had the distribution for aircraft in the Chicago territory for several months. When the show was first broached it attracted only minor interest, but as the date set for the exhibition approaches, it seems certain there will be a surprisingly large attendance.

Chicago has been more backward in aviation than the large eastern cities. Lack of a suitable landing ground for planes has forced flyers to forego visits to Chicago as much as possible, and the sight of a plane is still uncommon enough here to make the "man in the street" risk a few cricks in his neck to watch its maneuvers.

In addition to American exhibits, there will be several foreign models. its latest type of dirigible. The Army and Navy Aerial Mail and Signal Corps will also maintain interesting evhibits. Capt. Eddie Rickenbacker's Spad also is to be shown for the first time in the United States.

French Reliability Tour Set for March

PARIS, Dec. 13—(Special Correspondence)—A 2,600 mile reliability test for stock cars will be run round France from Mar. 1 to 24. In this competition reliability only will be considered, speed not being taken into account at all. Stock machines of 183 cu. in. capacity must be used, with complete equipment, and having at least two seats. Such essential parts as cylinders, gearboxes, rear axles and wheels will be stamped and cannot be changed during the run. Otherwise drivers and mechanics are free to do any work they like on the cars, providing they finish within the time limits.

Generally the stages will not be more than 125 miles per day, so as to allow the cars to finish early in the afternoon and to give dealers and the public an opportunity of examining them. There will be an exception for the first stage, which is from Paris to Metz, a distance of 200 miles. Among the big towns to be passed through are Strasburg, Dijon, Lyons, Nice, Marseilles, Toulouse, Pau, Bordeaux, Tours, Nantes, Le Mans, Rouen, Boulogne and Paris. Both factory and private entries will be received, the former being limited to three cars of the same make.

BUSINESS PROSPECTS GOOD IN NEAR EAST

Promise of Road Improvements Will Lead to Demand for Cars

WASHINGTON, Jan. 2—Inferior highways have been the chief obstacle to the sale of automobiles and motor trucks in the Near East, according to reports received by the Bureau of Foreign & Domestic Commerce from consular agents. At the same time, however, these reports are optimistic as regards the future and point to a possible profitable automobile business in Smyrna, Syria, Turkey and Morocco.

Under the Turkish regime automobiles were discouraged in Smyrna and only a few cars and trucks, chiefly of German manufacture, were operated. At the present time the roads in Smyrna are poor, the streets of the city being poorly paved and without repair for a number of years.

Syria offers better inducements to the automobile exporter because of its lack of railway connections between the cities of Aleppo, Killis, Aiantab, Marash, Ourfa, Antioch and Alexandretta. The war created many capable chauffeurs and mechanics and these are all purchasing cars and trucks for passenger and local freight service. The entire country is essentially argricultural and the consul believes that there will be a strong demand for tractors. The more moderate priced cars will be sought as the public highways and city streets are not in condition for heavy vehicles. There are no governmental restrictions at present against the operation of automobiles and the procurement of city licenses is a purely formal matter.

CONSTANTINOPLE

The commission houses of Syria will be the most probable buyers or importers, there being but one or two other establishments that interest themselves in machinery. Correspondence should be in French. Printed literature should be forwarded with price lists and discounts plainly mentioned. Prices should be quoted c. i. f. Beirut and Alexandretta, Syria, and not f. o. b. factory at some interior point in the United States, which makes it impossible for the customer to calculate the shipping expenses. The Aleppo consulate stands ready to furnish further information on the automobile situation on application.

At present there are but fifty private cars in Constantinople. Cheap, small cars will be found most suitable. Motor trucks were introduced in Turkey during the war and the demand for them is widespread and urgent. A few Fiat trucks have been imported since the armistice and were sold immediately at prices ranging from $2,640 to $4,800, according to size. French and British firms are very active. At present there are twelve private motor trucks in Constantinople, all of Benz and Mercedes manufacture. In addition, there are a number of trucks that have been sold to private individuals and kept in secret places.

Motorcycles, states the Consul General, would sell readily in Constantinople today and their sale will increase as the political status of Turkey is settled. The current prices vary from $380 to $630.

More than 600 passenger cars and fifty motor trucks are in operation in Morocco, and it is expected that these numbers will be greatly increased with the development of the system of roads that is now in contemplation In the zone of the French protectorate a system of roads is already being constructed between the principal cities, and a good macadamized road traverses the Tangier zone as far as the zone of Spanish influence, where good roads are entirely lacking. There are now 1,287 miles of good roads and 353 miles of secondary roads in Morocco.

GAS AND OIL

Gasoline and lubricating oils are easily obtainable in the various Morrocoean cities and are sold at practically the same prices as elsewhere in Europe. Tires of American, British and French manufacture are sold in Rabat, Casablanca and Tangier, but are seldom sold in other sections of the country. Automobile equipment is also sold where tires are carried in stock.

A light car of cheap and medium quality has proved most practical in Morocco. High-slung vehicles are particularly suitable for journeys over the uneven territory along camel and mule tracks away from the macadamized roads.

Motorcycles up to the present time have found no favor in Morocco and there are less than a dozen in the entire country. Dealers say there is no demand. There is no reason, however, says the Consul, why motorcycles should not find a comparatively extensive use in Morocco, especially with the continued influx of Europeans who have performed military duties and observed the practical uses of the motorcycles.

A list of importers and commission houses in the above-named countries can be secured from the Bureau of Foreign & Domestic Commerce or its District and Co-operative Offices, by referring to file No. 127643 and file No. 130291.

BIG YEAR FOR HANSON CAR

ATLANTA, GA., Jan. 2—G. W. Hanson, president of the Hanson Motor Co., the only manufacturers of passenger cars in the south, announced today that the company's business for the year 1919 so far exceeded expectations, that they were able to fill only about one-half of the orders received. This company manufactures the Hanson Six, known as the "Made in Dixie" car. The company has just closed the first year of its existence.

British Truck Lines Organize Exchange

LONDON, Dec. 17—(Special Correspondence)—British truck users are organizing a Road Transport Association and Exchange to be run on co-operative lines. The main ideas are to protect the interests of subscribers, and to provide clearing houses for merchandise.

One of the great problems of economical motor haulage is in this way being tackled, that is, the provision of "return loads." By the Clearing House and Exchange scheme it is hoped to avoid the waste arising from trucks returning empty to their starting points, anything from 10 to 200 miles away.

There has been no national organization aiming at the elimination of this uneconomical method of truck use, though one or two cities, such as Birmingham, have had their local clearing houses and exchanges.

Haulage contractors, especially those owning one or two trucks, are particularly interested, and this type of truck owner the new association intends to encourage, for it will endeavor to assist ex-service men in starting in this line of business. Another sphere of usefulness will be the collection and dissemination of intelligence concerning truck usage by means of a central information bureau.

Demand Grows for New Madison Tires

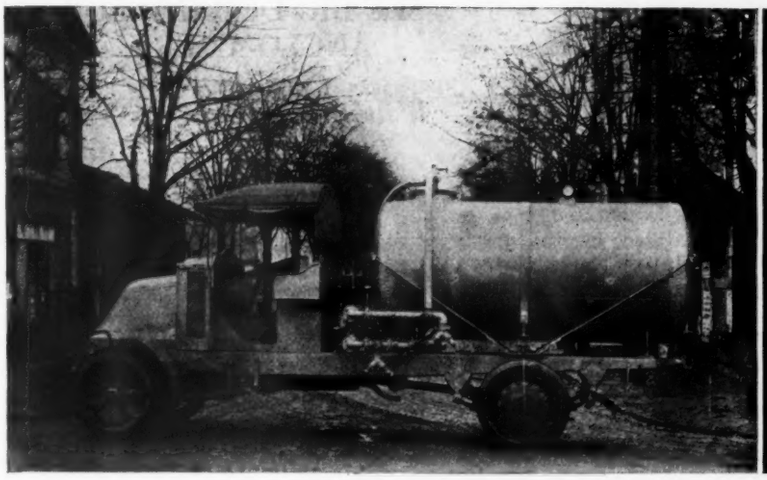
NEW YORK, Jan. 8—Plans of the Madison Tire & Rubber Co., Buffalo, for nationwide distribution and sales are rapidly maturing. Although new in the field, having been incorporated in New York state in May, 1919, and entering actual production in August, 1919, the demand for the Madison products have increased steadily to the point where 80 Madison cords and 300 Madison tubes are being sold daily through dealers.

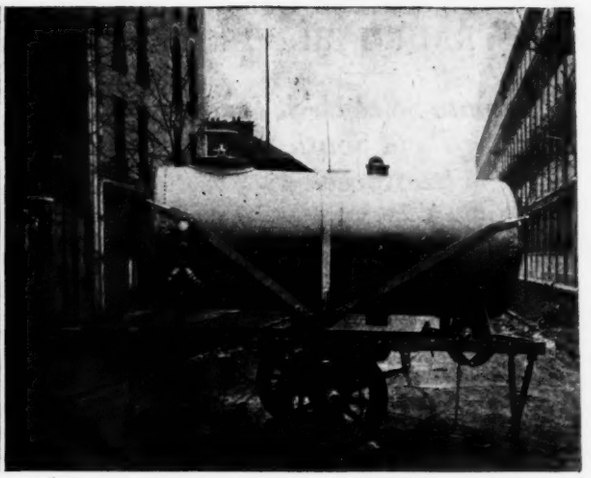
The policy of the company has been to extend exclusive sales rights to one retail tire dealer in each city or defined territory, and this policy is to be continued as a chief means of attaining national distribution.

The personnel of the company includes: Rudolph A. Low, president; Max Lowenthal, treasurer; Theodore W. Bassett, vice-president; Clarence Low, secretary; A. E. Tallmer, assistant treasurer.

TO MAKE AUTOMOBILE BOATS

PHILADELPHIA, Jan. 2—The Automobile Boat Co., a corporation backed by New York capital, has purchased a portion of the estate of the late Edward S. Whelen, between the Pennsylvania railroad tracks and the Delaware river, and the Fox and Harrison estates near Andalusia station, and will erect thereon a large plant for the manufacture of automobile boats.





Truck and Trailer Used By French Wine Makers

PARIS, Dec. 20—(Special Correspondence)—Being one of the oldest industries in the world, old-fashioned methods have persisted in the raising of the wine crops of France. For the transportation of wine from the grower to the wholesale dealer, for instance, each small land owner had his own individual methods, which might be by mule cart, by heavy wagon drawn by oxen, or by a special horse-drawn truck. This involved considerable waste of time and labor.

Arrangements have now been made for the wholesale dealer to collect wine from all the small growers by means of a special tank truck. The vehicle employed is a Renault 7-ton chassis, carrying a steel tank with a capacity of 1,600 gallons. Back of the driver's cab is an engine driven pump with four suction pipes, two being on each side. The pump is put into operation from the driver's seat. The truck is brought alongside the barrels, the suction pipes dropped into them, and in a very few minutes the wine is transferred to the tank, without a drop being lost. A dial on the top of the tank shows the quantity contained in it, and acts as a control for both the grower and the truckman. Quick action is necessary here, for the truck, when on its rounds, has to collect small quantities of wine from a large number of individual growers. A big manhole is provided for cleaning purposes. The tank can be emptied by means of a drainoff cock at the rear, or by means of the pump.

In addition to its load, the truck hauls a trailer with a tank containing 800 gallons of wine, the total load transportable by the one vehicle being therefore 2,400 gallons. The tank is filled by means of the pump on the truck. It is emptied by means of a central cock with two transverse pipes projecting just beyond the side of the frame members.

British Bid High For Army Tools

LONDON, Dec. 16—(Special Correspondence)—Despite reports to the contrary it is seen that the break up sales on closing war factories are fetching good prices for reputable and adaptable machine tools. Recently the following figures were obtained at an out-of-the-way sale. A Churchill (British) grinder complete with motor realized $4,625, and two Landers grinders respectively, $3,375 and $5,000; $2,500 was also paid for an Arundel cylinder grinder, and $5,000 for a Norton plane grinder. A No. 2 vertical Cincinnati milling machine fetched $7,875 and several others of approved pattern from $2,000 upwards. Capstan lathes realized from $400 to $1,500 according to size and condition, and general purpose.

Moto-Meter Salesmen Attend Convention

NEW YORK, Jan. 3—Purchase of their Long Island City home for approximately $500,000 was announced by the Moto-Meter Co., manufacturers of the Boyce Moto-Meter, at the sales convention held at the plant Dec. 31.

More than 100 members of the organization were present when the announcement was made.

The convention continued throughout the day and was marked by enthusiasm of the salesmen who brought encouraging reports from all sections of the country.

71 Makes at Phila. Passenger Car Show

PHILADELPHIA, Jan. 2—Complete figures for the nineteenth annual passenger automobile show, to be held Jan. 10-17, in the Commercial Museum, under the auspices of the Philadelphia Automobile Trade Association, show that there will be displayed the largest number of makes of cars ever exhibited in this city. The total is seventy-one makes of cars as against fifty-seven shown last year. Several new makes will be shown.

There will be twenty-two equipment exhibitors, a smaller number than usual, owing to increased demand for passenger car space.

Forty-one exhibitors for the motor truck show, which will be held in the Commercial Museum the week following the passenger car show, applied for space representing fifty-one makes of trucks, tractors and trailers, there being few of the latter two types of vehicles, however. A few equipment exhibits will be at the truck show.

Plan Extension of Air Forest Patrol

WASHINGTON, Jan. 2—The effectiveness of the airplane forest fire patrol as an aid in discovering and locating forest fires has been proved beyond question, and the new year will see a great extension of the work for the future.

The necessity of the new aerial service is clearly shown by the great fire losses of the past. The value of just three of the great National Forests is estimated at $62,280,000. Department of Agriculture statistics show that on an average for eight years (1910-1917) 5,315 fires in the various forests burned 1,163,756 acres of timber, representing a loss of $3,758,356 annually. From 1915 to 1917, 2,873 fires occurred in state and private forests, burning 8,052,945 acres at a loss of $9,875,000, not including the great Minnesota fire.

From June to August inclusive 745 flights were made. From June to October airplane patrol covered 202,009 miles, discovering 442 fires. Twenty-seven of these were reported in advance of the regular forest patrol and were entirely independent of them. The first actual use of aircraft was made in Wisconsin in 1915. On June 1, 1919, the first organized and sustained airplane forest fire patrol was inaugurated.

MAKERS VICTIM OF TRADEMARK PIRATE

Attempt to Seize U. S. Trade in Europe and South America Revealed

NEW YORK, Jan. 5—The demand for more adequate protection of American trademarks abroad was again emphasized in the report reaching this country a few days ago that one Manuel de Silva Carmo, of Oporto, has obtained control of the principal markets of Continental Europe and South America for American automobiles and tractors by taking advantage of the international trademark and patent laws and filing a few papers in Portugal at the cost of a few hundred dollars.

Under the Berne Trademark Convention, Carmo is enabled, by obtaining the registration of these trademarks in his own name in Portugal, to extend his control of these trademarks to the twelve other countries which are parties to the convention. Those countries include, in addition to Portugal: Switzerland, Holland, Mexico, Italy, Hungary, Austria, Belgium, Brazil, Cuba, Spain, France and Tunis.

Forty-three makes of American automobiles and tractors are covered by the operations of Carmo, among them being: Chandler, Velie, Cole, Grant, Chalmers, Paige, Auburn, MacFarlan, Saxon, Kissel, Dorris, Stutz, Mitchell, Moline, Buick, Jordan, Maxwell, Monroe, Chevrolet, Lexington, Winton, National, Stearns, Westcott, Haines, Mercer, and others, some of which are out of production.

This most recent example of the piracy abroad of American trademarks was discovered a few days ago when Albert E. Parker, a lawyer, of 220 Broadway, attempted to secure European registration for the Jordan, Mercer, and a few other cars. Through European correspondence Parker learned that Carmo recently had applied for the registration of the trademarks in his own name.

It is understood that numerous complaints concerning similar cases have reached Washington recently, but under the existing international understanding there is no way in which the United States government can successfully protest.

Under the Berne Trademark Convention a six months period elapses between the application and the grant of registration in Portugal, but according to Mr. Parker it is impossible for the owners of trademarks to prevent his obtaining registration in all of the cases. Some of the owners have registered in countries operating under the Berne convention, while others may register in those countries before the six months period elapses and the final grant is allowed.

Carmo is the only man entitled to sell these cars and tractors in the countries where he obtains the trademarks and this privilege extends to him the right to confiscate all cars bearing the trademarks he holds that are shipped to those countries.

Richard Mittler, an Austrian, successfully operated a similar coupe in 1918, on many of the best known American tires. He obtained registration under the Berne convention and efforts of the State Department to have his registration nullified have been unsuccessful. The American tire makers affected hope to have the grab nullified by the Peace treaty. This is not possible in Carmo's case because he is a citizen of an allied country.

Great Britain recently acted to protect her trademarks through the passage of a trademark measure providing that any trademark which has been actually used in trading operations in Great Britain for two years may be registered by the user. According to Parker, this will entitle British manufacturers to extend their registrations in those countries where a certified copy of the home registration is demanded. Legislation of this nature is needed here, says Parker.

The action of Carmo will come up for discussion at a meeting of the National Automobile Chamber of Commerce in New York tomorrow, at which manufacturers from all parts of the country will be represented. P. S Steenstrup, export manager for the General Motors Corps., said today, the situation would be taken up at a meeting of export managers next week.

Army Issues Rules For Flying Fields

WASHINGTON, Jan. 3—A complete set of general rules to be observed at all United States flying fields has been issued by the Army Air Service. The rules are for guidance in the operation of hangars, for inspection of machines, for operation of fields and for operation of airplanes on the ground and in the air.

During the war each field formulated its own rules, with the result that pilots flying from one field to another found themselves breaking the rules at the strange fields. For this reason, and for the sake of standardization of flying fields, the general rules have been compiled to apply to all air service activities in this country. They contain only general rules in regard to hangars, machines, ground rules and rules of the air. It is understood that each individual field will also have special rules peculiar to its own locality.

BODY OUTPUT INCREASED

CLEVELAND, Jan. 2—Greatly increased output of bodies by two Cleveland firms is promised for 1920. The Ohio Body & Blower Co. has begun work on three large factory buildings to cost $450,000, and additions are being made to the plant of the Lang Body Co., which will increase production five times. Like many other body builders in Cleveland and other parts of the country, this company has been unable to meet the demands.

SEE BIG DEMAND FOR ANGLO-AMERICAN CAR

Willys-Overland Crossley Combination Plans Annual Production of 25,000

NEW YORK, Jan. 6—The failure of British car makers to attain the quantity production promised after hostilities ended in 1918, and their tardiness in introducing American methods has had its answer in the recent organization of the Willys-Overland-Crossley Co., Ltd.

The object of the combination, which plans an annual output of 25,000 cars, is to manufacture Overland machines by employing American processes and British labor. At the outset American foremen will direct the production, but eventually the cars turned out will be literally British made.

The location of the plant is particularly favorable. It was designed by the Crossley Motors, Ltd., for war work, but with the idea of making it a permanent peace-time plant and is ideally adapted to the American production methods.

The corporation has been registered in England with a capital of $12,000,000.

E. B. Jackson, vice-president of the Willys-Overland Co., of Toledo, who recently returned from England after having closed the negotiations for the new venture, was highly elated by the promising field for quantity car production he found, and predicted a brilliant beginning for the new company.

He said: "Undoubtedly, the American automobile industry is on the brink of a new departure in export trade. We have resorted to co-operation instead of competition with European motor car manufacturers. There is little prospect of American manufacturers being able to do business in markets like Great Britain on any other basis."

Federal Bushing Co. to Treble Business

DETROIT, Jan. 1—Expansion plans of the Federal Bearing & Bushing Corp. contemplate trebling the present output of 200,000 bearings and bushings each month, with the completion of its new factory in August. Work on the new plant will be started next week and will be rushed to completion. A mark of 700,000 a month has been set as the production schedule as soon as the machinery in the new plant begins to function.

The rapidly increasing business of the concern necessitated an increase in the capitalization and authority was granted for raising it from $60,000 to $350,000, $200,000 common and $150,000 preferred. The preferred stock was subscribed immediately and none of it was put on the market. The company manufactures exclusively babbitt-lined bronze-backed bearings, bronze bushings and bronze castings.

GRADUATED FEE LAW EFFECTIVE IN OHIO

Suit of Automobile Association to Test Measure to Be Filed Immediately

COLUMBUS, O., Jan. 2—The newly enacted graduated license fee law for Ohio motor cars became a law Dec. 31 because of a failure of Governor Cox to sign the measure. The governor was not satisfied with the provisions for the care of funds derived from the law, although he was loath to veto it and permitted it to become effective without his signature. He urges upon the legislature an amendment by which the state treasurer instead of the secretary of state is made custodian of the funds, which is expected to bring in over $6,000,000 yearly, to be used for road improvement and street repair.

The suit, fathered by the Ohio Automobile Association, to test the constitutionality of the law will be filed at once. The petition has been prepared by the association attorneys and will probably be filed in the Franklin County courts.

In the meantime, since it is impossible for the Ohio Automobile Department to issue tags under the new law for some time, old 1919 tags will be acceptable to police authorities for cars already in use. In case of the purchase of new cars, the Columbus Automobile Club has devised a plan whereby cardboard numbers will be used until legal matters are straightened out.

ITHACA PLANS BIG SHOW

ITHACA, N. Y., Jan. 3—Cornell University has granted permission to the Ithaca Board of Commerce to hold the Ithaca Automobile Show in the New York State Drill Hall, on the campus, Feb. 3-7.

Ross W. Kellogg will again manage the show. The automobile dealers' section of the chamber will have charge of the arrangements and the Ithaca Automobile Club will co-operate.

Demands for space thus far indicate that the show will be three times its former size.

Heaslet in Control of Signal Truck Co.

DETROIT, Jan. 2—James G. Heaslet, who last week was elected president of the Signal Truck Co., today confirmed the report that he had secured control of the concern by purchase of stock. Heaslet succeeds W. K. Hoagland, resigned.

Asked regarding the future plans of the company, Heaslet said there would be no money spent in new buildings or equipment but it would be retained as working capital and production speeded up to 100 per cent efficiency with the present plant and equipment. He declared present facilities if properly directed were capable of yielding a greatly increased output. A safe, conservative policy, he said, would be maintained and no move made toward a large expansion program until such a step became an actual necessity.

Heaslet, who resigned as vice-president in charge of production at the Studebaker plant to take over the Signal, began his career with the Autocar in 1897, as chief engineer, and later held the same position with the Garford Truck Co.

Cole Plans Double Output This Year

DETROIT, Jan. 2—Cole Motor Car Co., of Indianapolis, rapidly is completing the factory additions that will permit of 100 per cent increased production. President J. J. Cole, who founded the organization, announces that the output of 6,500 Aero-Eights in 1919, would be increased to more than 12,000 in the new year. A new east wing to the main plant, practically a duplicate of it, and a four-and-one-half story building north of the main plant, represent an expenditure of approximately $1,000,000, and give the company 600,000 sq. ft. of floor space. The company's gross business in 1908 was $900,000. The 1920 gross is expected to reach $40,000,000.

WINTHER CHANGES

NEW YORK, Jan. 2—At a recent meeting of the Winther Motor Truck Co. directors, at Kenosha, Wis., G. D. Smith was elected vice-president and director, and C. T. Abbott, secretary.

Smith has reorganized the sales, advertising and service departments and has been instrumental in the largely increased shipments of the company for November.

British Railways Extend Truck Use

LONDON, Dec. 17—(Special Correspondence)—Railway managements in Great Britain have used motor trucks for many years for the delivery and collection of town and city merchandise, but have hitherto confined their use to short journeys. But as a result of the congestion on all British railroads, longer journeys are now being undertaken.

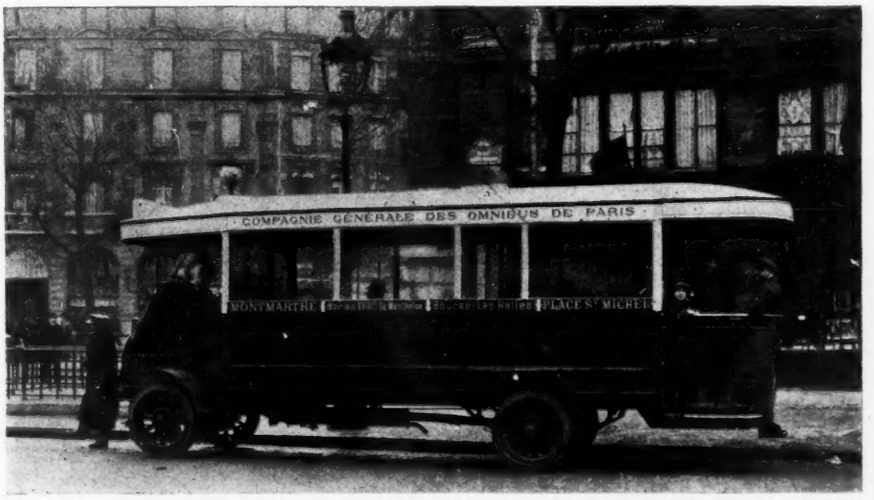
The London and South Western railway, for example, is running a regular freight service by motor trucks between London and Portsmouth, a distance of approximately 70 miles each way. Other railway companies are almost daily increasing the volume of this extended road traffic, and the distances between points of collection and delivery.

SHOW TRACTOR MOVIES

LUBBOCK, TEX., Jan. 2—As a means of arousing interest on the part of farmers of the prairie region of western Texas in the use of tractors for farming, moving pictures of farm operations in which the tractor plays an important part are being given. It is stated that these moving pictures answer the purpose of tractor demonstrations to a large degree and are of unfailing interest in the rural communities and towns where they are given.

Recently, Col. A. J. Bester, of Klokfontain, Colesburg, Cape Colony, South Africa, took moving pictures of two large tractors pulling a gigantic plow of his invention upon his big farm and ranch near Bovina, Texas. Moving pictures were also taken of other scenes upon his 6,400-acre ranch. These pictures have been shown at Plainview and other towns of this section.

A New Paris Bus



Paris has put into service a new fleet of motor buses similar to the one shown in this photograph. They are single-deckers, with first and second-class compartments. The rear platform is designed to carry 12 passengers standing

LEGAL ACTION HALTS SALE OF OLYMPIAN

Mismanagement Charged in Application for Injunction and Receiver

DETROIT, Jan. 3—In an attempt to prevent the sale of the Olympian Motors Co., Pontiac, to Otis Friend and his associates, action has been started in the Federal District Court here alleging gross fraud and mismanagement and asking for the appointment of a receiver. F. K. Parks, former president; St. Clair Couzens, vice-president and general manager; William Passmore, vice-president and treasurer; C. E. Callender, secretary, and others, are made respondents. The application is made by James Gibson and other stockholders.

Couzens, after reading the petition, declared it was spitework emanating from a former assistant to President Parke, who had been "fired" by Couzens. He said a deal now on foot for the transfer of the company to Otis Friend or to David Henry, Chicago financier, would be consummated at a meeting in Chicago, Monday, at which Friend and Henry will be present. Couzens said the only true allegation in the petition was the statement that Parke was paid an exhorbitant salary of $10,000, adding that it would not have been exhorbitant for a man qualified to conduct the affairs of the organization.

In alleging gross frauds the petition recites that the defendants caused to be formed a company under the name of C. E. Callender & Co., and thereafter contracted with that concern for the sale of stock in the Olympian, paying 20 per cent to the agent for selling and 15 per cent to Callender & Co., the "sums so paid being divided between Couzens, Parke and others."

Large and fraudulent salaries, $10,000 a year for Parke and $7,500 for Couzens, are alleged; gross mismanagement on the part of the officials "who did not possess a knowledge of automobile manufacturing and business they represented themselves to possess;" shipment of many cars improperly assembled and mechanically defective and which were turned back at great loss, notably, one car load to Des Moines, and another to Pittsburgh; squandering of money, in selling cars that cost $1,900 to manufacture for $1,250; wasting of thousands of dollars for a lobby at Washington to secure an aerial bomb contract on a cost plus 10 per cent basis, on which the company lost much money through mismanagement; execution of a mortgage for $300,000 on the company's property to secure bonds which were hypothecated with Shadburne Bros., Chicago brokers for $150,000, which defendants "wrongfully and fraudulently kept and used"; securing of proxies, fraudulently, by which certain of the directors were voted power to sell the property at a price and terms satisfactory to them are other complaints listed in the petition.

The petition asks for a restraining order enjoining the holding of any meetings of directors or their attempt to act in the name of the Olympian Motors Co., enjoining any action looking to the sale of the plant and for a receiver.

The suit was filed in Federal District Court in Detroit and the petition alleges the 83 stockholders named are acting in the interests of 4,000 stockholders, whose claims aggregate $1,000,000. The Olympian Motors Co. was incorporated under Delaware laws May 31, 1916, with a capitalization of $1,000,000 which was increased to $2,000,000 in January, 1917, all common stock of the par value of $100.

Kessler Motor Co. to Build Light Four

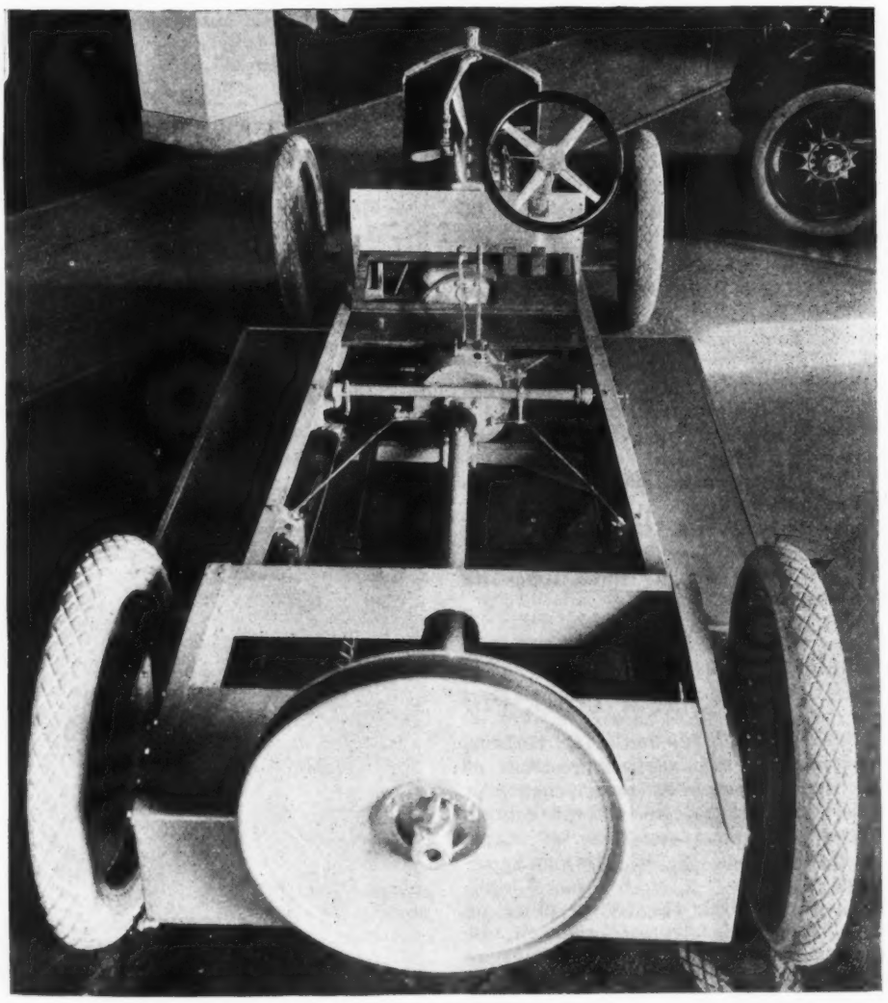
DETROIT, Jan. 1—The Kessler Motor Co., of Detroit, which for several years has been developing an aviation engine under government contract and supervision, will bring out a light four automobile. It will be assembled of standard parts equipped with a Kessler engine.

Columbia Motors Co. in Temporary Plant

DETROIT, Jan. 2—Columbia Motors Co. has begun operations in the two plants formerly occupied by the Everitt Body Co., at Mack avenue and the Michigan Central tracks, where it will be housed until the new factory buildings on West Fort street are completed late in the summer. The property on East Jefferson avenue vacated by the Columbia Motors Co. is owned by Morgan & Wright, who will wreck the building and erect a modern structure. The temporary quarters of the Columbia Co. contain about 150,000 ft. of floor space. But leases have been secured on additional nearby properties which when occupied will increase the company's floor space to 250,000 sq. ft. Columbia this week shipped 135 Sixes by special train to Charles E. Riess, New York distributer.

BREAK GROUND FOR FOUNDRY

LA CROSSE, WIS., Jan. 5—The Automotive Foundry Co., of La Crosse, Wis., a new $100,000 corporation, has broken ground for the first unit of its new gray iron and malleable shop.



The new Fergus offers a new departure in oiling equipment. The springs are contained in leather booths which communicate for lubrication purposes with the transmission case. The entire chassis oiling system is automatic

MICHIGAN TOUR TO BOOST GOOD ROADS

Around Lake Huron Trip in July to Cover 1,230 Mi. 300 Entries

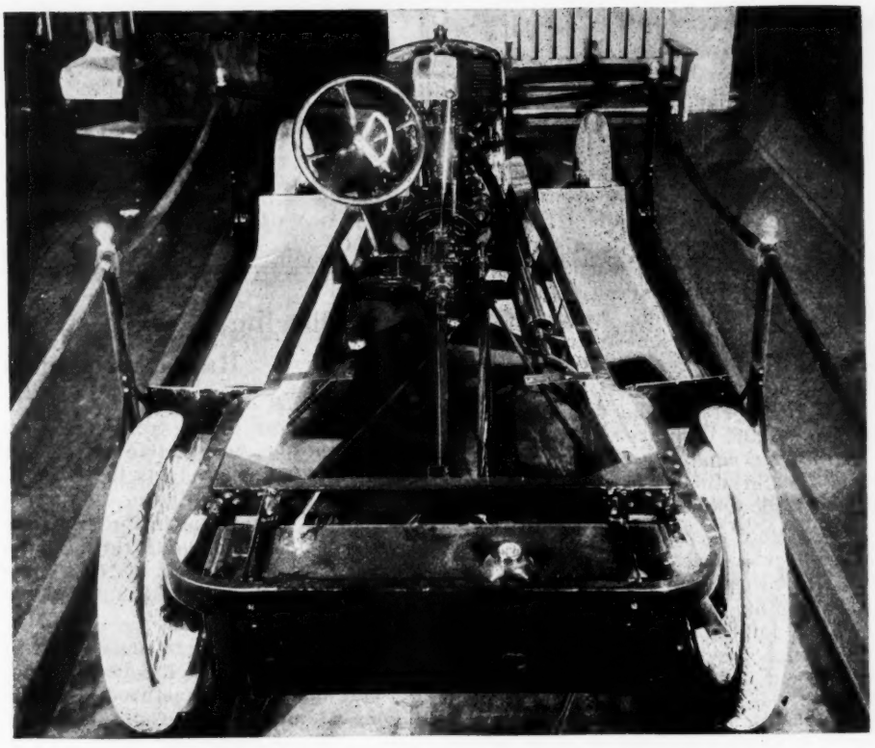
DETROIT, Jan. 2—The Michigan Pikes Association's International tour will start from Detroit, July 14, and while no name has been selected, the suggestion has been made that it be called "Around Lake Huron Tour." Committees in charge of the preliminary work rapidly are completing plans for the trip which will skirt the shores of lakes Erie and Ontario to Ontario, thence north through Muskoka to North Bay, west to Sault Ste. Marie, and thence by the "Over the Top" route through Michigan to Detroit. About 300 have signed up for the trip.

The tourists will be given a rousing sendoff in Detroit, with a banquet and parade, after which the party will proceed to Windsor and go into camp for the night. The trip will consume 15 days, the tourists crossing the Canadian border three times enroute.

Designed primarily as a good road boosting jaunt, the tour will cover 1,230 miles, 445 of which will be over Michigan roads and the rest in Canada. Plans contemplate the most pretentious tour yet made in the campaign for better highways.

A fleet of motor trucks will accompany the tourists and fully equipped camp outfits will be carried, the tourists spending ten of the fourteen nights under canvas. A sanitary corps, two physicians, cooks, bridge engineers and laborers will be included and everything that goes to make up a well-ordered summer tour will be arranged for. Numerous pleasure trips and dinners and banquets already have been scheduled by towns and cities along the route, and a brass band, professional quartet and other entertainment features will be included to help the good road propagandists. The itinerary follows:

July 14, leave Detroit; night stop, Windsor, July 15, lunch, Blenheim; night stop, London. July 16, lunch, Hamilton; night stop, Toronto. July 17, lunch, Barrie; night stop, Bracebridge. July 18, spend Sunday in Bracebridge. July 19, lunch, Burk's Falls; night stop, North Bay. July 20, lunch, Sudbury night stop, Espanola. July 21, spend day on Spanish river. July 22, lunch, Blind river; night stop, Thessalon. July 23, arrive Sault Ste. Marie, Ont., 10:30 A. M., and remain in camp until afternoon of July 24. July 24, cross to Sault Ste. Marie, Mich., and spend night. July 25, lunch, St. Ignace; night stop, Cheboygan. July 26, lunch, Gaylord; night stop, Grayling. July 27, lunch Harrison; night stop, Alma. July 28, lunch, Lansing; night stop, Jackson.



Bird's-eye picture of the New Saxon Chassis

Supply Jobber Moves Into Automobile Row

NEW YORK, Jan. 3—Charles E. Miller, automobile supply jobber, has announced the removal of his business from 97 Reade street to 231 West Fifty-fourth street, where he will occupy the entire building, containing 18,000 sq. ft. of floor space, about April 1. Miller announces that a complete stock of automobile hardware and tools will be added.

Truck Firm Appointed to Distribute Cars

NEW YORK, Jan. 6—The R. E. Taylor Corp., distributer of Signal trucks, has been appointed distributer of Jones "6" and Lorraine cars for New York, New Jersey and the New England states. The cars are expected to be displayed in the Taylor corporation showroom, Thirty-eighth street and Seventh avenue, during the latter part of this week.

JOHNSON CO. TO BUILD

RACINE, WIS., Jan. 5—The S. C. Johnson & Son Co., Racine, Wis., large manufacturer of waxes, polish, radiator compounds and other specialties, has announced plans for a new factory to cost about $200,000, to be erected early next spring. The company also contemplates the establishment of a branch plant in Canada. On Dec. 31 the company made the distribution of $45,000 among its employees in the form of capital shares in the corporation, as a bonus on 1919 earnings.

Tariff Revision Is Planned by British

LONDON, Dec. 19—(Special Correspondence) — Though the national budget program is not due for at least three months, rumor is rife of the coming revision of the basis of taxation of motor cars. The familiar formula drawn up by the Royal Automobile Club, which has been used so long, and in later years has given rise to anomalies, though it has usefully developed curtailment of bore and lengthening of stroke, will be replaced. The following suggestions have been made for a suitable basis. Taxation based on weight, price, horsepower, or tires. Excepting horsepower, American cars will benefit under any or all of the other three suggested bases.

Hartford Dealers in New Association

HARTFORD, CONN., Jan. 3—Inability to secure space in the Thirteenth Annual Automobile Show of the Hartford Automobile Dealers' Association at the State Armory, Jan. 17 to 24, resulted in the formation of a new association known as the Automobile Trades Association of Hartford. Fred W. Lycett of the L & H Motor Co., Locomobile and Hupmobile distributers, is the president of the new organization. Robert J. Flynn, chief executive of Robert J. Flynn, Inc., Westcott distributer, is vice-president, and Charles B. Beach of the L & H Motor Co., secretary. Morris M. Andrews is treasurer.

Men of the Industry

Changes in Personnel and Position

Airdome Director at Mineola Dies

TORONTO, Jan. 2—Major A. E. McKeever, who died recently at the Toronto General Hospital, was one of the most distinguished of Canadian airmen. He was recently appointed head of the airdrome at Mineola. His death followed a severe accident in which his thigh bone was broken, when he was in an automobile accident near Stratford on Sept. 2. The bone was badly set at the time and he came to the Toronto General Hospital recently to have the bone broken and properly set. Following the operation he regained consciousness and appeared to be doing well, but his condition changed for the worse on Christmas day, and his death followed soon afterwards.

Major McKeever, whose home was in Listowel, was originally in a Queen's Own Battalion, and went overseas in 1916, joining the R. F. C. In March, 1917, he joined a squadron in France, and during nine months of active service, gained such a reputation that he went by the name of "Hawkeye." His D. S. O. was awarded for an exploit in which he encountered two enemy two-seaters and seven scout machines in stormy weather. He succeeded in destroying two of them, while his observer was responsible for two more.

On a subsequent occasion he engaged eight enemy machines single handed and destroyed one, driving five others down out of control. For this he received the M. C., and subsequently following other exploits, was awarded a bar to his M. C. In addition to these decorations, Major McKeever had been awarded the D. S. C. and the French Croix de Guerre. Later he returned to England, where he assisted Lieut. Col. Bishop, V. C., in the formation of the Canadian Air Force. Recently, as the result of a recommendation from the British government, he was appointed to the command of the Mineola airdrome, at a salary of $10,000 a year. He was credited with victories over forty-five German machines. Major James McKeever, of Vancouver, is a brother.

A. G. McMillan, formerly eastern salesmanager of the automobile service station equipment division of the Fairbanks Co., has been appointed general salesmanager of this division. The change adds sales in the far West to his responsibilities. His headquarters will be in New York. H. B. Garvey, who formerly handled western sales from Chicago has resigned.

George W. Pontius, Jr., service manager for the Cleveland Tractor Co., is on a trip to England and the continent to build up an efficient foreign service organization.

Kelly Distributor of Raydex Products

NEW YORK, Jan. 2—Charles F. U. Kelly, a pioneer of the automotive industry, who has been active in the distribution of many products in the past, including Dreadnaught and Lee tires, has added another line to the extensive business he now conducts through the Charles F. U. Kelly, Inc., of New York, with branch offices in San Francisco, Chicago and Kansas City.

His latest distribution activities will be connected with the Raydex automotive products, manufactured by the Raydex Manufacturing Co., of Brackenridge, Pa. These products include the Raydex Glareless Glassless Lens, the Raydex Spotlight and the Raydex Transmission liners for Ford cars.

C. E. Cullum, recently resigned as supervisor of foundry practice for the General Motors Truck Co., has been made production superintendent for the Industrial Foundry Co., St. Johns, Mich.

Frank M. Germane has been elected vice-president of the recently organized Standard Steel & Bearings, Inc., successors to the business of the Standard Roller Bearing Co., with which he had been identified many years.

Matthew C. Moore, for eight years district manager of the White Co., Cleveland, with headquarters in Milwaukee, resigned Jan. 1 to join the Packard Motor Car Co., Detroit, as special truck transportation engineer. Moore left Jan. 2 for the oil fields of the southwest to make a thorough investigation of truck transportation as adapted to oil-well and pipe-line development. Moore is a pioneer in the motor car industry of Wisconsin, first as a publisher and later as a dealer and distributer. He has always specialized in motor truck development work and is regarded as one of the best truck sales engineers in the United States.

Herbert A. Faulkner has been appointed advertising manager of the Moreland Motor Truck Co., of Los Angeles. Faulkner has had wide experience in the East as a practical newspaper and advertising man. He was especially well known through his originality and initiative in the conduct of his department as general passenger and advertising agent for the Bay State Street Railway Co.

Mercer Slated for Needham Presidency

NEW YORK, Jan. 3—Lieut. Col. A. L. Mercer, for several months assistant director of sales of the War Department, resigned Jan. 1 to become president of the Needham Tire Co., Charles River, Mass. It is reported that the board of directors will elect Mercer president at the January meeting.

Coincident with this report comes the announcement that the Needham company will expand its tire business to include a full line of rubber goods for automotive uses.

Mercer entered the service in September, 1917, as an ordnance officer, and was stationed at the Remington Arms plant, Hoboken. Several promotions followed which led to his appointment, July 1, 1919, as assistant director of sales. Before his military service, Mercer was associated with the B. F. Goodrich Rubber Co. He will be succeeded as assistant director of sales by Maj. H. S. Johnson, a special representative of Director of Sales E. C. Morse.

P. A. Tanner, for the past four years mechanical engineer, service and advertising manager of the Sumter division, Splitdorf Electrical Co., Chicago, has been transferred to the main office and factory in Newark as secretary of the company with supervision over service, advertising and catalog compilation.

O. W. Smith, who has been doing field service work for the Sumter division, Splitdorf Electrical Co., has been promoted to division service manager, succeeding P. A. Tanner.

HEADS JOHNSON BRONZE CO.

NEW CASTLE, PA., Jan. 2—P. J. Flaherty has been elected president of the Johnson Bronze Co., New Castle, to fill the vacancy caused by the recent death of G. W. Johnson. Flaherty organized the Johnson company and was instrumental in its development. He joined the company in 1909 when it was known as the American Car & Ship Hardware Co., and reorganized it under its present title. He has been in executive charge of the business since that time.

NEW COAST MANAGER

DETROIT, Jan. 2—C. Ernest Albright, formerly western field manager of the Acason Motor Truck Co., recently left for the Pacific coast, where he will become salesmanager in that territory for the Standard Motor Truck Co. Associated with him as field representatives are Edward W. Kruspe and R. B. Bowman, western and eastern salesmanagers respectively.

Current News of Factories

Notes of New Plants—Old Ones Enlarged

Black & Becker Co. Plan Double Output

BALTIMORE, Jan. 2—A two million dollar business in 1920 was the big thought of the annual sales convention of the Black & Decker Mfg. Co. of this city, which had a sales organization and convention here the last three days of the old year. Plans for practically doubling the company's output of electric drills, air compressors, and valve grinders was presented and explained to the organization. On Tuesday night there was a banquet, dance and vaudeville show which was attended by five hundred men and women.

The Black & Decker Mfg. Co. began the development of their business three and one-half years ago, in a small machine. shop. A year and a half ago they erected a building which was considered by some entirely too large. They have just now completed a building which is six times as large as the one that was thought too big a year and a half ago. The 1919 business was a million and a quarter dollars.

Keuka Industries Buys Curtiss Plant

HAMMONDSPORT, N. Y., Jan. 2—The Curtiss Aeroplane & Motors Corp. factories at Hammondsport, N. Y., have been sold to L. J. Seely as the home of the recently formed Keuka Industries, Inc., and will be used for the development and manufacture of a new automobile engine. While the engine is being developed several contracts will be undertaken to hold the working force together.

Officers of the new Keuka corporations are: L. J. Seely, president; John H. McNamara, vice-president; K. B. MacDonald, secretary and treasurer. The directors are Glenn H. Curtiss, Hugh Satterlee, and the officers mentioned. All of these men, with the exception of Satterlee, have been for years connected with the Curtiss companies.

TO DOUBLE BODY OUTPUT

DETROIT, Jan. 2—The Briscoe Motor Corp., which recently took over the John Bohnet Co., of Lansing, is planning improvements and additions that will double the capacity of the plant and permit a production increase of 100 per cent. The Bohnet Co. is one of the largest manufacturers of closed bodies in the country, and in taking it over, Briscoe Corp. secures every facility for building all the bodies for Briscoe closed models.

CHANGE OF NAME

UTICA, N. Y., Jan. 2—The Powell Muffler & Timer Co. has changed its name to The Powell Muffler Co. The company is now making more than 1,200 mufflers a day for use on more than fifty makes of cars and trucks.

Ajax Co. to Erect Plant at Sandusky

NEW YORK, Jan. 2—The Ajax Rubber Co. is to build a large fatcory in Sandusky, O., according to a recent announcement by Horace DeLisser, president. The erection of the new plant is to begin at once on the 90-acre plot recently acquired by the company in Sandusky, and by the larger part of 1920 tire production is expected to be well under way.

This is the third big factory for the Ajax company, the others being in Trenton, N. J., and Racine. Sandusky was selected for the site of the new factory because of its geographical position in the distribution of Ajax products.

Coincident with the building program the company plans the erection of 1,000 to 1,500 homes in Sandusky for Ajax workmen. The housing plan will be similar to the one now under way at Racine, and is being worked out by the Ajax Industrial Welfare department.

INCORPORATIONS

WILMINGTON, DEL., Jan. 2—The following corporations have been chartered under the laws of Delaware:

Booty Carburetor Manufacturing Co., of Wilmington, with a capital of $1,000,000, to manufacture carburetors. The incorporators are T. L. Croteau, H. E. Knox and S. E. Dill, all of Wilmington.

Traffic Truck Sales Co., Inc., with a capital of $200,000, to do a general brokerage and commission business. The incorporators are M. M. Lucy, M. Butler and L. S. Dorsey, all of Wilmington.

Liberty Motor Service Co., of Wilmington, with a capital of $5,500,000, to manufacture automobiles, etc. The incorporators are T. L. Croteau, H. E. Knox and S. E. Dill.

Turn-Auto Corp., of Wilmington, with a capital of $1,000,000, to develop a patent for an adjustable automobile holder. The incorporators are Baldwin Springer, George S. Allmon and Everett E. Barlow, all of Wilmington.

Allen Tire & Rubber Co., with a capital of $1,000,000, to manufacture and deal in automobile tires. The incorporators are M. L. Horty, S. L. Mackey and M. C. Kelly, all of Wilmington.

Sparks-Withington Adds New Building

JACKSON, MICH., Jan. 2—Coincident with the announcement that the Sparks-Withington Co. had taken over the Cleveland Radiator Co., of Cleveland, comes news of a building program that contemplates making it one of the largest plants of its kind in the world. Four new buildings will be erected immediately and another story added to plant No. 2, the additions practically doubling the output of the factory. The force of 1,100 employees will be doubled when the new program is completed.

A four story stockroom, 70x400 ft., between plants No. 1 and No. 2 is well under way. A switch will be extended into the stockroom permitting unloading direct from the cars. As soon as this is completed the new story will be added to plant No. 2 to be 2,400x 700 ft. These two projects are scheduled for completion by April 1. The third building will be a two-story office structure, 50x100 ft., but work on it will not be started until construction of a recreation building for employees has been completed. A building, 25x 100 ft., for the heavy presses, will complete the building program. Work on all of the additions will be completed during 1920.

Carlisle Tire to Build Big Factory

NEW YORK, Jan. 2—The Carlisle Tire Corp., recently incorporated in Delaware with $3,000,000 capital, has purchased recently a 10-acre factory site in Stamford, Conn., on which a large plant will be erected. Floor space at Andover, Mass., has been leased for the production of tires until the new plant is ready.

The officers of the new corporation include: Joseph M. Gilbert, president; C. V. McGuire, vice-president; F. R. Serles, secretary; Frank Williams, treasurer; J. S. Bretz, chairman of the board of directors. Directors: C. V. Tuthill, W. R. B. Whittier, N. E. Parish, Charles Glover and J. S. McClurg.

DESIGNS STEEL WHEEL

NEW YORK, Dec. 6—The American Steel Foundries, maker of steel railroad equipment, has characterized as "premature" the recent report that the company had branched into the manufacture of disk steel wheels. Robert P. Lamont, president, is authority for the statement that the company has been experimenting with steel wheels with the hope of working into the business if there proves to be a demand for such wheels.

The new subsidiary known as the American Auto Parts Co., for which a plant is being built in Detroit, expects to be in quantity production of springs within a few months. The plant is being pushed to completion as rapidly as possible.

Calendar

SHOWS

January—New York, International Automobile Mfrs. Congress.

Jan. 3-10—New York, N. Y. Grand Central Palace, National Automobile Chamber of Commerce. S. A. Miles, Manager.

Jan. 3-10—New York City. Eighth Coast Artillery Armory, commercial cars and accessories.

Jan. 8—Chicago, Airplanes. Manufacturers' Aircraft Association. Congress Hotel.

Jan. 12-17—Dayton, O. Annual Automobile Show, Borchers Auto Co.'s new building. Dayton Auto Trade Assn. H. C. Phelps, Director, and B. J. Borchers, Chairman.

Jan. 13-17—Erie, Pa. Overland-Erie Garage, Erie Automobile Dealers' Association. A. L. Nelson, Manager.

Jan. 17-21—Cleveland, Nineteenth Annual Automobile Show, Cleveland Automobile Mfrs.' and Dealers' Assn. Wigmore Coliseum.

Jan. 17-24—Hartford, Conn., Shows, State Armory, Annual Exhibition. Arthur Fifoot, Manager.

Jan. 18-24—Worcester, Mass. Automobile Show. Worcester Automobile Association.

Jan. 19-25—Oakland, Cal. Annual Motor Show, Alameda County Automobile Trade Association. Civic Auditorium. Robert W. Martland, Manager.

Jan. 19-25—Milwaukee, Wis. Auditorium, Annual Motor Exhibition. Milwaukee Automobile Dealers', Inc.

Jan. 22-24—Lancaster, O. Annual Automobile Show, Fairfield County Auto Trades Assn. Sherman Memorial. W. H. Payne, Manager.

Jan. 24-31—Chicago, Ill. Coliseum. Cars: Drexel Pavilion, National Automobile Chamber of Commerce. S. A. Miles, Manager.

Jan. 24-31—Chicago, International Amphitheater, Commercial cars and accessories.

Jan. 31-Feb. 6—Kansas City, Mo. Annual exhibition, Overland Bldg. E. A. Peak, Manager.

Jan. 31-Feb. 7—Minneapolis, Minn. Twin City Automobile Truck, Tractor and Industrial Show, Overland Bldg.

February—Chicago, International Automobile Mfrs.' Congress.

February—Deadwood, S. D. Annual Show, Deadwood Business Club. F. R. Baldwin, Manager.

Feb. 2-7—Rochester, N. Y. Rochester Automobile Trades Association, Exposition Park. Benjamin L. Peer, Manager.

Feb. 2-7—Toledo, Ohio. Annual Automobile Show, Terminal Auditorium.

Feb. 3-7—Wilmington, Del. Automobile Show. Hotel duPont.

Feb. 3-7—Baltimore, Md. Automobile Show, Baltimore Automobile Dealers' Assn. Fifth Regiment Armory. John C. O'Brien, Manager.

Feb. 9-13—Charlotte, N. C. Automobile Show, Charlotte Automobile Trade Association. Lee Folger, Chairman, Show Committee.

Feb. 9-14—Cedar Rapids, Ia. Annual Automobile Show, Linn County Motor Trades Bureau. Auditorium. W. J. Hutchings, Chairman, and H. M. Davis, Secretary.

Feb. 9-14—Poughkeepsie, N. Y. Annual Automobile Show. Poughkeepsie Auto Club. Armory. George A. Coleman, Manager.

Feb. 9-14—Salt Lake City. Annual Automobile Show. W. D. Rishel, Manager.

Feb. 9-14—Nashville, Tenn. Nashville Automobile Trade Association.

Feb. 10-13—Fargo, N. D. Barry Bldg. Fargo-Moorehead Automotive Trade Association. H. L. Wilson, Director.

Feb. 10-15—Quincy, Ill. Annual Automobile Show.

Feb. 14-22—San Antonio, Tex. Automobile Show. San Antonio Automobile Trade Assn. W. A. Williamson, Manager.

Feb. 16-21—Des Moines, Ia. Annual Automobile Show. Des Moines Automobile Dealers' Assn. Ford Factory, Dean Schooler and C. G. Van Vliet, managing.

Feb. 21-28—San Francisco. Fourth Annual Automobile Show. Exposition Auditorium. Motor Car Dealers' Assn. G. A. Wahlgreen, Manager.

Feb. 21-28—Louisville, Ky. Twelfth annual exhibition. Louisville Automobile Dealers' Assn., First Regiment Armory.

Feb. 23-28—Elmira, N. Y. Elmira State Armory. Elmira Automobile Club. H. S. Bryan, Manager.

Feb. 23-28—Car Show. Hippodrome Building. Dealers' Motor Car Association. M. O. Wilkins, Manager.

Feb. 23-28—Truck Show, Armory. Dealers' Motor Car Association. M. O. Wilkins, Manager.

Feb. 22-28—Ottawa, Ontario. Motor Show.

Feb. 23-28—Grand Rapids, Mich. Motor Car Show. Furniture Exposition Building. M. D. Elgin, Manager.

Feb. 23-28—Duluth, Minn. Automobile Show. Duluth Auto Trades Assn. W. F. Daly, Director.

March—New York. Aeronautical Exposition. Seventy-first Regiment Armory. Manufacturers' Aircraft Association.

Mar. 1-6—Springfield, Mass. Annual Automobile Show, Auditorium. Springfield Automotive Dealers' Assn. Robert H. Clark, Manager.

Mar. 1-6—St. Joseph, Mo. Annual Automobile Show. St. Joseph Automobile Show Assn. Auditorium. John Albus, Manager.

Mar. 1-6—Grand Ropids, Mich. Truck Show, Furniture Exposition Bldg. M. D. Elgin, Manager.

March 1-7—Springfield, Mass. Annual Automobile Show, Springfield Automobile Dealers' Assn. Harry Stacy, Secretary.

March 1-8—Seattle. State Armory. Motor Car Dealers' Association. William J. Coyle, Manager.

Mar. 7-13—Muskegon, Mich. Automobile Show, Muskegon Auto Business Men's Assn. J. C. Fowler, Manager.

Mar. 10-13—Lebanon, Pa. Annual Motor Show, Automotive Trade Association of Lebanon. James Furniture Store Bldg. J. Paul Enck, Manager.

Mar. 12-20—Boston, Mass. Annual Automobile Show, Mechanics' Building.

Mar. 15-20—Great Falls, Mont. Automobile Show. Montana Automobile Distributors' Association.

Mar. 20-27—Trenton, N. J. Annual Automobile Show. Armory. Trenton Automobile Dealers' Assn. John L. Brock, Manager.

FOREIGN SHOWS

January—Glasgow, Scotland. Scottish Motor Exhibition.

February — Manchester, England. North of England Motor Exhibition.

Feb. 22-March 6—Birmingham, Eng. British Industries Fair.

March—London, Eng. Motor Boat Marine and Stationary Engine Exhibition.

March—Adelaide, Australia. All Australian Exhibition of motor vehicles, airplanes, engines and automotive equipment.

March 1-15—Lyons, France. Automotive Products, Lyons Industrial Fair.

March 20-27 — Pittsburgh. Motor Square Garden. Automotive Association, Inc. John J. Bell, Manager.

April or May—London, Eng. Commercial Vehicle Exhibition. Olympia.

April 3-May 4—Buenes Aires. Exposition of U. S. manufacturers.

July—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

TRACTOR SHOWS

Feb. 2-14—Wichita, Kan. Tractor and Farm Machinery Forum. Wichita Thresher-Tractor Club. Club.

Feb. 16-21—Kansas City, Mo. Fifth Annual Kansas City Tractor Club. Guy H. Hall, Manufacturer.

CONTESTS

August, 1920—Paris, France. Grand Prix Race, Sporting Commission Automobile Club of France.

June, 1920—Omaha, Neb. Reliability Truck Tour.

CONVENTIONS

Feb. 9-13 — Louisville, Ky. Seventeenth Annual Convention American Road Builders' Assn., Tenth American Good Roads Congress, and Eleventh National Good Roads Show.

May 13-20, 1920 — San Francisco. Seventh National Foreign Trade Convention.

S. A. E. MEETINGS

Jan. 6-8—New York. Annual Meeting.

Jan. 13—Chicago. Aeronautic Meeting, auspices Mid-West Section.

Jan. 28—Chicago. Truck and Tractor Meeting, Hotel La Salle.

Feb. 12—Kansas City, Mo. Tractor Dinner, Hotel Baltimore.

FORM RADIATOR CO.

ZANESVILLE, Jan. 2—The Federal Radiator Co. has been chartered with a capital of $525,000 for the manufacture of radiators and auto supplies. The incorporators are A. T. Baker, A. L. Rea, H. Knoddler, G. C. Fergus and E. A. Evans.

FORM GERMAN COMBINE

WASHINGON, Jan. 2—A German automobile combination has been formed for the purpose of conducting sales of cars and products of its members, according to a report received by the Bureau of Foreign and Domestic Commerce. The constituent concerns are the Dux-Aytomobil-Werke Aktiengesellschaft, in Wahren, near Leipzig; the C. D. Magirus Aktien-Gesellschaft, in Ulm, the Voglaendische Maschinenfabriek, formerly Dietrich Aktien-Gesellschaft and the Presto-Werke Aktien-Gesellschaft in Chemnitz. Joint sales agencies will be maintained abroad and each constituent member will be limited to a building program which will serve the double purpose of reducing the cost of production and preventing overproduction.

HOLDS OWN OLYMPIAN

LONDON, Dec. 17—(Special Correspondence)—The extremely congested state of the Olympia Show in November prevented many would-be buyers from inspecting their favored or fancied cars. Finding that this applied to a large number of Midland "prospects", George Heath, a well-known Birmingham dealer, has carried through what amounts to a motor exhibition on his own account.

He obtained from various makers and British representatives fourteen cars and chassis that had been at Olympia, and the display, representing a total value of $100,000, attracted from 500 to 600 potential purchasers each day.

Heath holds an agency for each of the cars shown, which included Cadillac, Guy and Minerva chassis, Lanchester, Sunbeam, Napier, Overland and other complete British and imported cars.

FORM NEW MOTOR CO.

SEATTLE, Jan. 2—The Hendricks Manufacturing Co. and Rothweiler & Co., both of Seattle, have consolidated under the name of the H. R. L. Motor Co., and will begin business with a capital of $400,000.